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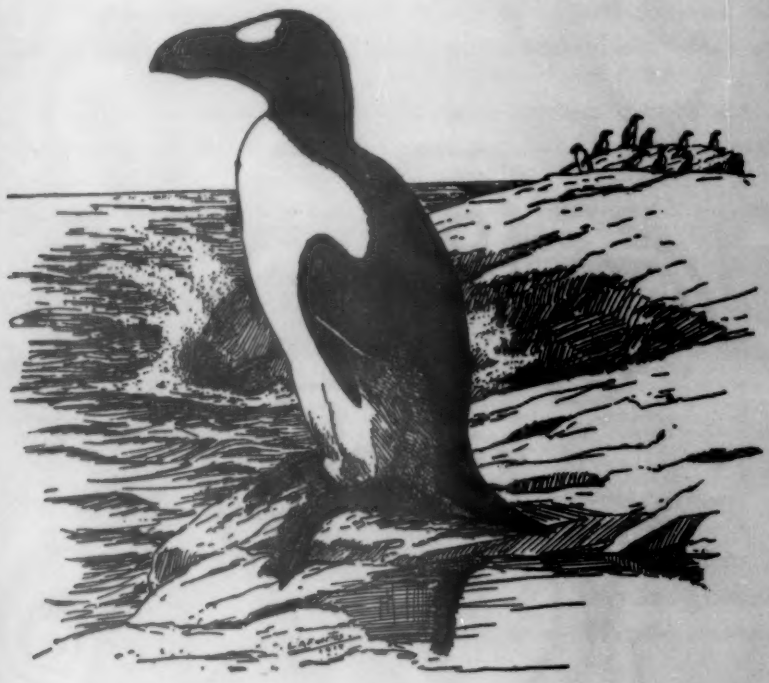

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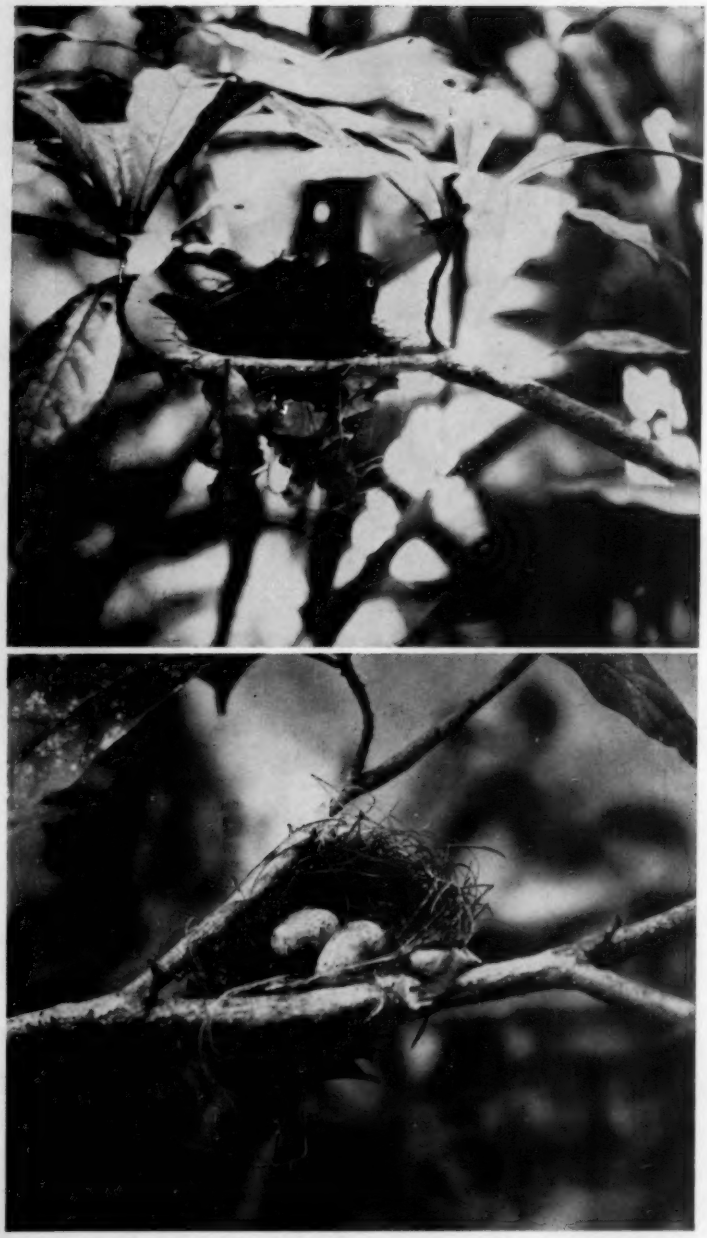

(*Upper*) FEMALE YELLOW-THIGHED MANAKIN INCUBATING. BARRO COLORADO ISLAND, MARCH 23, 1935. (*Lower*) NEST AND EGGS OF YELLOW-THIGHED MANAKIN. BARRO COLORADO ISLAND, MARCH 30, 1935.

THE AUK

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ORNITHOLOGY

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LIFE HISTORY OF THE YELLOW-THIGHED MANAKIN

BY ALEXANDER F. SKUTCH

THE yellow-thighed manakin (*Pipra mentalis*) is one of the smallest, yet one of the most conspicuous of the birds of the Central American lowland forests. Although less than four inches long and clad nearly everywhere in velvety black, the male manakin with his intensely red head and hindneck attracts attention amid the dark underwood of the high forest, where many a bigger but duller bird passes unseen. His bright yellow eyes, yellowish bill, and lemon-yellow thighs add color to his striking attire. His conduct is quite the reverse of retiring; with sharp whistles, loud snapping sounds and brisk movements, he seems to try to draw attention to his flaming headdress. Throughout the Caribbean lowlands, these manakins appear to be one of the most abundant birds of the forest, although perhaps surpassed in numbers by other birds which, because of more modest attire and secretive habits, seem far more rare.

The female manakin, in her dull olive-green plumage, is also likely to escape detection as she flits through the dim undergrowth of the forest. Although it is quite impossible to confuse the male yellow-thighed manakin with any other Central American bird, the female does not differ greatly in appearance from other small manakins of her sex. She is, however, more olive and less green than the females of Salvin's manakin (*Manacus aurantiacus*), Gould's manakin (*M. vitellinus*) and the blue-capped manakin (*Pipra coronata*), with all of which she mingles in one portion or another of her range. Her feet are dark, not flesh-colored like those of Salvin's and Gould's manakins. Her bill is black except at the base of the lower mandible, where it is horn-color; her eyes are usually brown, rarely yellow as in the male.

The yellow-thighed manakin ranges through the heavy rain-forests on the Caribbean side of the American continent from southern México to Darién. On the Pacific side of the Cordillera it is found in

the lofty forests of southern Costa Rica, in Panamá, Colombia and northwestern Ecuador. It is absent from the drier forests of the Pacific side of Central America north of Costa Rica. Within its extensive range several geographic races have been distinguished; the present study deals with *minor* of the Canal Zone and *ignifera* of the Térraba Valley of Costa Rica. On the Pacific slope of southern Costa Rica the yellow-thighed manakin is found as high as 3500 feet, where it appears to be resident, but the bird is not abundant above 2500 feet. In the regions where I am familiar with it, this manakin is practically confined to the high forest. At times it may venture for a short distance into adjacent stands of tall second-growth, but it avoids low thickets and cleared lands. Likewise, it seems rarely to ascend into the sun-bathed crowns of the tall forest trees but remains in the shade of the lower half of the forest, probably passing most of its life between five and seventy-five feet above the ground.

FOOD

The yellow-thighed manakin subsists chiefly upon small berries and insects which it plucks from foliage at the end of a rapid dart and without alighting. Not infrequently these manakins join the motley band of birds which forage with the army ants. In the Costa Rican mountain forest I came upon a large and varied aggregation of birds which had congregated about an immense swarm of black army ants. Here were three kinds of antbirds, two species of dendrocinclas, the gray-headed tanager, two kinds of flycatchers, a wintering russet-backed thrush, and a number of manakins, the smallest members of all this heterogeneous avian crowd. Among the last-mentioned were several female yellow-thighed manakins and at least one young male, recognized by the traces of red beginning to appear on his crown. There were also a number of female blue-capped manakins, but of neither species was an adult male present. The manakins of both kinds perched amid the undergrowth, above the swarming ants, and made short, swift darts to seize insects that tried to escape the ants by flying, or to pluck off those which crawled up the stems or foliage of saplings. One of the yellow-thighed manakins flew swiftly down to snatch a small lizard from among the ants, then rose with her victim to a low perch, against which she proceeded to beat it. But small as it was, for a lizard, it was too big and heavy for the manakin's small short bill and soon slipped from her grasp. She followed it to the

ground in an attempt to recover it, but the lizard had hidden itself under the dead leaves.

COURTSHIP

The bright colors, the peculiar whistles and mechanical sounds, the bizarre antics, which call attention to the male yellow-thighed manakin and make him the most conspicuous bird of his size—almost of any size—in the forests where he dwells, are significant in relation to his manner of courtship. Like many, perhaps all, other members of the family, the yellow-thighed manakins do not form pairs during the breeding season. The females build their nests, incubate their eggs, and rear their young without help from the males, which during the period of reproduction are to be found day after day in certain definite spots, where they advertise their presence by a variety of devices, and where the females visit them when their developing eggs are ready for fertilization. Male birds of almost all species with similar marital habits depend upon sound, color, or both, to announce their location to the other sex; and for so diminutive a creature as the yellow-thighed manakin it is important that these means of self-advertisement be especially well developed.

Although a number of earlier naturalists and explorers had written briefly about the peculiar 'dances' and other courtship habits of various species of manakins in South and Central America, Chapman (1935) was apparently the first to make a careful study of the habits of any member of this family. In 'The Courtship of Gould's Manakin (*Manacus vitellinus vitellinus*) on Barro Colorado Island, Canal Zone,' he summarized the earlier literature on the courtship habits of manakins, then described how a number of male Gould's manakins gather in one particular locality in the forest, where each clears for himself a small space on the ground, separated by several yards from the similar 'courts' of his neighbors. Each male 'dances' above his own court, snaps his wings and calls, continuing this behavior during a long breeding-season which occupies the greater part of the year. Attracted by these varied sounds produced by the assembled males, the female visits the mating ground but forms no lasting bond with the other sex. In the same paper, Chapman repeats a brief account—which had earlier appeared in 'My Tropical Air Castle' (1929)—of the courtship of a 'Red-capped Manakin', but he made no comprehensive study of this species.

THE DISPLAY PERCH

Like Gould's manakin, the male yellow-thighed manakin selects at the outset of the breeding season a definite post where he will perform

day after day over a period of at least several months. In keeping with the height at which this species forages, rests, and nests in the forest, it does not clear a space on the ground, but chooses a perch well above it. This is typically a straight, slender, more or less horizontal branch, which for a length of several feet is free of foliage and of lateral branchlets and is unobstructed by the surrounding vegetation. The display perch is usually the branch of a small tree, sometimes one of the uppermost boughs. Rarely, a slender vine stretching across a fairly clear space between the trees will be the chosen post of the manakin; but the individuals I have found in such a position were less active in courtship. The chosen branches of nine yellow-thighed manakins which I kept under observation on Barro Colorado Island in 1935, ranged from about 20 to 45 feet above the ground. Most of the boughs on which I have found these manakins displaying in other regions would fall within this range of heights, but one male, which I watched in El General, had selected a display perch about 70 feet up. The horizontal limb where Chapman watched a male perform at the end of December, 1926, was about 15 feet above the ground.

THE COURTSHIP ASSEMBLY

The display perches of the courting males are not scattered at random through the forest, but are gathered into groups or 'courtship assemblies.' I had two of these assemblies under observation on Barro Colorado Island in 1935. The first assembly contained five males. The first bird (A), which was consistently the most active in display, had chosen for his stage a slender horizontal branch near the center of the rounded, open crown of a tree of medium size at a height of about 35 feet above the ground. Two more males (B and b) in adult plumage were usually to be found close together, perching upon vines strung across an open space beneath the forest canopy, about 20 feet south of A and 40 feet above the ground. Two more (C and c) rested much of the time close together in the tops of some slender trees about 40 feet north of A, and about 45 feet up.

The second courtship assembly contained four birds whose display branches were all more widely separated from each other than in the case of the first assembly. The first three manakins occupied positions which formed the corners of a roughly equilateral triangle about 125 feet on a side, as nearly as I could measure distances through the bushy undergrowth between the display trees. The fourth member of this assembly had his display site in a tree about 75 feet from one of the corners of the triangle formed by the first three, amid bushes so dense that it was very difficult to watch this bird.

VOCAL SOUNDS OF THE MALE

Into these exhibitions on the display perches enter so many sounds produced by both voice and mechanical means and so many antics of the most varied sorts, all intermingled in the most changeable sequences, that an account of a complete performance without a preliminary analysis of the elements of which it is composed would likely bewilder the reader. The manakin's outstanding vocalizations are:

1. An exceedingly short, high *psit.*
2. The same note delivered very rapidly but more softly about five times, thus: *psit psit psit psit psit.*
3. The same note given two or three times and followed by a buzzing sound.
4. *Psit psit psit p'tsweeee - - psip.* The final *psip* is not always uttered, but when delivered is sharp and emphatic. This, or the long *p'tsweeee* alone, is perhaps the most characteristic call of the bird—at least, the one most frequently noticed as you walk through the forest. It is uttered at intervals by the males as they sit quietly on their display perches during the hours of the day when they are least active. The whistled *p'tsweeee* is long-drawn, high-pitched and thin.
5. A high, shrill, rather harsh *tseeee* or *eeee,* voiced as he returns to his display perch after a short circling flight, or as he alights upon the back of a female after a similar flight. If one member of an assembly utters this call while his neighbors are resting quietly, it stirs them to renewed vocal and muscular activity.

MECHANICAL SOUNDS

According to Chapman (1935: 473), the male yellow-thighed manakin "possesses marked structural [secondary] sexual characters. Its secondaries are enlarged, curved and stiffened, as in *Manacus,* its rectrices stiffened, its thighs yellow and its tarsi more feathered than in the female." Like other manakins with stiffened wing feathers, the male yellow-thighed manakin uses them to produce loud snapping sounds by rapid movements of his wings, which apparently cause the thick shafts of the plumes to strike noisily together. The snaps somewhat resemble the sound made by breaking a thin but strong dry twig. The wing movements which produce these sounds are so rapid, and the source of the loud mechanical noises so obscure to the casual observer, that some naturalists have hastily inferred that they were made by snapping together the mandibles, or even with the voice.

The snapping sounds may be made singly or in rapid sequence, producing a whirr or a sort of snapping roll. One of the exercises of the male consists in taking short, rapid flights between his display perch and neighboring boughs. When engaged in this display, he customarily delivers a single loud, sharp *snap* each time he leaves the perch. While remaining on his perch, he often produces a short

snapping *whirr* by beating his wings with the utmost rapidity. Indeed, the whole series of wingbeats which accompanies the rapid but brief succession of *snaps* is over so soon, that unless I happened to be looking directly at the manakin through my binoculars at the moment he made the noise, I could not be sure that he moved his wings at all. More rarely, while resting quietly on his perch, a manakin will raise his wings and beat out a series of loud *snaps* in a more deliberate fashion, the crackling sounds coming more slowly than in the snapping roll and at the same time with greater force. Correspondingly, the wing-beats are more distinct to the eye than when the snapping roll is made, and it is easy to see that the movements of the wings are somehow associated with the production of the sound. Both the single *snaps* and the snapping roll of the yellow-thighed manakin are less loud than the corresponding noises of species of *Manacus*.

In addition to these snapping sounds, the male manakins produce various whirring and rustling noises with their wings, either while they fly or by beating their wings while perching. As they approach the display perch in the short circling flight already mentioned, they make a surprisingly loud noise such as may be imitated by holding a piece of stout cloth between both hands and suddenly jerking it taut. At the instant this noise is made there is a momentary break in the bird's flight. After delivering this flourish, the manakin alights upon his display perch or upon the back of the waiting female.

Display Movements of the Male

In their nuptial activities birds of all kinds assume postures which display the most brilliant colors in their plumage. The bright red head of the yellow-thighed manakin is at all times so eye-taking an object that it is hard to imagine anything the bird might do to make it more conspicuous. But the thighs are most of the time less obvious to the beholder, and many of the postures and antics of the courting male seem designed to display these colorful adornments to the best advantage.

1. *The About-face:* The male manakin stands on his display perch with his legs stretched up so that his yellow thighs are plainly revealed. His body is horizontal or even tilted slightly forward. In this posture he about-faces as rapidly as he can. One foot is held on the perch; the other moved from side to side of the stationary foot as the bird pivots back and forth. The changes in the position of the foot are so rapid, however, that without the most careful scrutiny one is apt to overlook them. Each time he faces about, the bird gives his wings a resonant flap.
2. *The Backward-slide:* Standing upon his display perch, the male manakin straightens his legs until his yellow thighs are plainly revealed, as in the about-

face. At times his aspect becomes almost spidery, so high are his slender legs stretched up. He inclines his body forward, sometimes so strongly that his head almost touches the branch, and raises his tail. By short and very rapid, mincing steps, he moves backward along the perch, seeming to slide or glide rather than to walk over it. The foliage at the end of the twig is set into rapid vibration by his innumerable short steps. After covering a few inches he may turn and slide backward in the reverse direction. Often he whirrs his wings, or shakes his tail rapidly from side to side, as he moves tail-foremost over the branch. One male held his wings above his back as he slid backward toward a female perching quietly on his display branch.

3. *Darting Back and Forth:* The manakin flies rapidly back and forth between his display perch and another a few feet away. Each time he leaves the perch he produces a loud *snap* with his wings.
4. *The Circling Flight:* The manakin rapidly flies out several yards from his display perch, circles around in the air and returns to it. As he nears the bough he breaks his flight to make the surprisingly loud noise that has been compared to the sound produced by jerking a piece of stout cloth between the hands. As he alights upon the perch he utters the loud, shrill *eeee.*

ACTIONS OF MALE WHEN FEMALE COMES TO DISPLAY PERCH

Throughout the day, as they wait on their display perches in the shade of the forest, the male manakins repeat their varied notes, snap and whirr their wings, and perform their bizarre stunts, often in a subdued, leisurely fashion. There is almost always some sound and some activity in the courtship assembly. The activity, both bodily and vocal, of the males reaches a higher pitch of intensity whenever a dull, olive-green female appears. This is true not only of the male she favors by visiting his display perch, but of his neighbors as well. The favored one now displays in such rapid sequence, calls and snaps with such vehemence, that the onlooker is all but bewildered by the show. On four occasions I have witnessed the male manakin's courtship activities when a female came to his perch. In the belief that an account of the thrilling display, written soon after its termination, will give a truer picture of what actually happens than any generalized statement reconstructed from old records after the lapse of years, I give here excerpts from my journals of the period.

"March 5, 1935. This morning I reached the manakin's tree at about eight o'clock, just in time to be witness to some exciting events. The manakin (A of Assembly 1) was standing on his usual perch with his legs stretched up so that his yellow thighs were plainly revealed, and his body horizontal or possibly tilted a trifle forward. In this pose he swung about, back and forth, back and forth, just as rapidly as he could, at each turn executing a complete about-face . . . At each rapid turn he gave his wings a loud flap, and all the time he kept his thighs very much in evidence. Tiring of this, he flew rapidly back and forth between this perch and another a few feet distant, making a loud, rustling noise with his wings as he did so.

"In a few minutes a somberly clad female flew into the tree and perched quietly on a limb a few feet below the male. The latter continued his antics, and presently the female flew up to the twig where he was performing, alighting with a little space between herself and him. The male continued his demonstration with renewed ardor, pivoting back and forth and striking out his wings as before. At intervals he advanced toward her with his body raised and tilted slightly forward and his thighs very conspicuous. He moved with a sort of gliding motion produced by very short, rapid steps, a few inches at a time, and with his tail turned toward the female. Sometimes as he slid obliquely backward toward her, he shook his tail rapidly from side to side, but on other advances he held it still. Suddenly he darted away, but returned in an instant to the same perch as though he had been hurled from a catapult. Just as he approached the perch he made a loud noise such as can be produced by holding a stout piece of cloth between both hands and suddenly pulling it taut. This was doubtless produced by rapidly beating his wings, for there was a break in his flight. Upon touching his perch he uttered a high, shrill *tseeee*. Again he slid obliquely backward toward the female, and she slid in his direction, tail somewhat in advance of her body, rapidly beating her wings. When the two had come very close together, the male again leaped into the air, described a small circle, returned with a loud flourish of his wings as before, and alighted on the female's back, where he remained but a moment. Upon separating from her, he continued his twistings and short flights as before, but the female remained perfectly motionless for a minute or so, then flew out of sight. After she left, the male, his energy in no way abated, perched in his usual position and pivoted forty times by actual count, as already described.

"March 7, 1935. This afternoon at 2:40 I visited Group 1 of the red-headed manakins and found bird A and one of the two B birds resting quietly in their usual positions. After I had been there only a few minutes the birds became suddenly more active and called more. Manakin A began to fly quickly back and forth between his principal perch and another small branch a few feet distant and somewhat higher in the tree. At each take-off he made a *snap* with his wings. On the main perch he slid back and forth, sometimes slowly and sometimes rapidly, then about-faced and jumped with a *snap* toward the other perch. I was so engrossed in watching him that I had not noticed that a female had arrived and was perching about a yard from his main perch. After flying back and forth many times, he alighted on the main perch and stayed there, sliding obliquely backward and wiggling his tail. In his backward sliding his body was bent far forward and his head depressed, almost touching the perch. These antics were evidently the invitation for the female to come across to the principal perch, for after a few moments of this she alighted near the male. The latter then began to execute his amazing series of about-faces. After this series of twistings, with the accompanying wing-beats, the male manakin began to slide toward his visitor; but unlike the female who was courted two days ago, this one sidled away at his approach. When this occurred the male took wing, circled around and returned with a loud flourish of wings, alighted on the female's back uttering a high, shrill, rather harsh *eeeee*, and sexual union took place. This occupied but a few seconds; and when it was over the male flew off, leaving the female perching quietly where the mating had occurred. The male circled off on another flight and attempted to mount the female as before; but just at the proper moment to avoid him she side-stepped and he landed on the branch instead. A second attempt of the male to alight upon her was frustrated in the same manner by the female, who then flew away.

"While all this was taking place the other two males (the B's) were performing just as spiritedly as the favored one, . . . It is noteworthy that, although they seemed very eager to win the female, they made no attempt to intrude upon A's inner domain, or to break into his proceedings. One of them performed on a slender, horizontal branch near the vines where the two usually perch together, and the other among the lower branches of A's tree, but well out of A's way. Both called frequently while A courted and seemed much excited. It is of interest that at this crucial moment these manakins resorted to perches where they do not habitually remain, while the successful manakin won his lady on his customary perch.

"After the female departed, the excitement rapidly died away. At the end of fifty minutes I left A resting quietly in his usual position, and the two B's perching close together among the vines. I did not notice either of the C birds this afternoon."

Later in the season, a female's visit to a display perch had a rather different outcome, as told in an entry made in my journal on May 24, 1935:

"This morning I revisited Group 2 of the red-headed manakins for the first time in many weeks. I found that all four males still sit on the same twigs which they used when I first discovered them in March. Although they still utter their calls and long-drawn whistles, it seemed to me that their voices have become much weaker than they formerly were, and that they have become quieter and less demonstrative than earlier in the season. While I watched, a female manakin alighted on the display perch of male B, who courted her in the fashion I have already described, although he went through the various portions of the act more briefly than I have seen before. When, approaching the perch at high speed and uttering the usual long-drawn *eeeee*, he was about to alight upon her, she lifted up her open bill to forfend him, and he alighted on the twig beside her. She left the display perch but flew about in the vicinity, and soon returned to it again. Once more the male courted her, in a rather sketchy fashion, and once more he was warned to desist when about to complete the act of union. This happened several times over. The female also went through some of the courtship antics beside the male, but in a less spirited fashion. At length she became tired and flew away."

On March 21, I found manakin A of this same assembly standing on a branch at a distance from his display perch, close beside an olive-green bird with yellow eyes, who might have been either a female or an immature male. He behaved in about the same manner as he would have while perching near another adult male on one of the visits so frequent between neighboring males,—going through his courtship displays in a subdued form. The olive-green manakin rested quietly beside him and finally flew away, without having shown any sign of emotion. Then male A returned to his display perch.

INTERRELATIONS OF THE MALES

Each display perch is the private property of a single male yellow-thighed manakin, and I did not once see a second male attempt to trespass upon it. Even during the excitement attendant upon the

arrival of a female, when all the activities of the males are carried on with a swifter rhythm, neglected males do not invade the precincts of their neighbor. Each of them, by his increased zeal in performing, appears to be trying to draw her to him, but each seems to be aware that she is to be won only through strictest compliance with the age-old ritual of the courtship assembly. The choice of a mate rests wholly with the female, and the unchosen males never attempt to influence her by forceful intrusions.

During the long periods when no female comes near the assembly, two males often rest close together upon some bough between their respective display perches. While in the courtship assembly, some males spend most of their time in close association with another and are rarely to be found alone on their display perches; others may very rarely visit a neighbor. In Assembly 1, male A was usually alone on his display perch and did not often go visiting. Males B and b passed most of their time perching close together, as also did males C and c. These four males, when present in the assembly, remained in a certain limited space among the trees, in which there were several slender branches close together that shared their favor almost equally. They were often absent from the neighborhood and abandoned their posts earlier in the season than A. It is significant that male A, who was more constantly on his own display perch, received the only visits, two in number, that I saw a female make to this group.

In Assembly 2, all four males stayed fairly constantly on their own perches, but occasionally two would come together at some midway point. On March 21, while I watched manakin B of this group rest idly on his display perch 35 feet above the ground, manakin C, on his own perch 125 feet away, uttered the long, rather harsh whistle which is usually used as the male flies back to his perch after a short flight in the presence of the female. Upon hearing this, B flew off in the direction of C's perch, and C also advanced toward B. The two met among the boughs about midway between their respective perches. Upon coming together they flitted around each other, making short flights between perches a few feet apart, and snapping their wings at each take-off. Then they perched only six or eight inches apart, half-exposing their thighs and continually flitting their wings. Sometimes one slid backward along the perch toward the other, wagging his tail; but the second generally sidled away and prevented their coming into actual contact. After about five minutes of this idle play, manakin B suddenly flew back to his display perch; then C more slowly returned to his own.

Twice more, during the course of the morning, these two manakins

came together in the same manner and always in the same place. Apparently the males recognize particular perches on which they meet their neighbors, as well as special perches where they display to the females.

When two male manakins visit together, they customarily rest on some slender, horizontal branch, about six or eight inches apart. Here they go through many of their courtship displays, but in a mild and subdued manner. The act most frequently practiced on these occasions is the backward slide, but only half done, not in the whole-hearted manner of actual courtship. Chapman found that, while waiting for a female to appear, two Gould's manakins often rested close together at some point between their courts. One member of such a pair, and always the same, would address little attentions to the other, who consistently refused to return them. Chapman called the former a 'submissive' manakin, the latter a 'dominant' manakin, in the belief that the first, in paying these compliments to the other, recognized his superior social rank. With the yellow-thighed manakins these little displays are not one-sided. Sometimes one of the two males dances toward the other, then the play is reversed. While one bird glides toward the second, the latter may remain perfectly passive and apparently indifferent; but later, perhaps after a considerable interval during which both remain quiet, the second will turn and dance toward the first, who now looks on passively.

A Male Manakin's Day

In March, when the season of courtship was at its height, the male manakins arrived at their display perches early, while the light was still dim beneath the forest canopy. Thus on March 6, the five manakins of Assembly 1 took their usual positions between 6:35 and 6:40 a. m. (Canal Zone Time). At this time of year, the bird world in general began the day's activities between 6:15 and 6:20, and some remained quiet until 6:30.

Upon reaching their display perches, the manakins at first called and performed with great energy, just as other birds sing most heartily at dawn; but soon they settled down to a rather inactive morning. By nine o'clock on this particular day, no female had arrived to stir the males into increased activity. The B's and the C's visited together or wandered off through the forest and remained out of sight for long periods. But manakin A was at his post, where much of the time he rested quietly, head drawn in and feathers puffed out, doing nothing save look about with bright yellow eyes and utter an occasional lazy whistle. His absences for hunting food were relatively brief, for he

found much close by. He scrutinized the foliage in his immediate vicinity and, when he espied an insect crawling over a leaf, made a quick dart to snatch it up, returning to his perch to eat it. If the insect was large it would be knocked sharply several times against the branch to still its struggles, before it was gobbled down.

As they rest on their display perches at no great height, the male yellow-thighed manakins are almost fearless of man. One can walk about freely beneath them or even hack at the undergrowth with a machete without driving them away or disturbing their normal routine. They merely peer down inquisitively and perhaps voice a sharp whistle.

The manakins display on their chosen perches during a considerable part of the year. Chapman's observations of a displaying male were made at the end of December, 1926. At the end of May, 1935, at least five manakins occupied the stations where I had first found them in February or early March.

On Barro Colorado Island in November, 1939, I found young males, still in olive-green plumage but flecked with red on head and hind-neck, practicing the courtship displays of the adults, but in a subdued form. They occupied display perches of the usual type; but whether these represented a more or less permanent choice and would be used during the following breeding-season, I could not determine,

COURTSHIP DISPLAYS OF THE FEMALE

When she visits the display perch of a male, the female plays a largely passive rôle. She may rest quietly on the perch and submit to his attentions, or she may respond to his backward slide with a similar movement of her own (see p. 8). But on the four occasions when I saw a female visit a male's display perch I witnessed no more vigorous demonstrations on her part; and the female which Chapman watched on a male's display perch was apparently equally passive.

Yet while wandering through the forest, I have repeatedly seen yellow-thighed manakins in female plumage perform in a fairly vigorous manner many of the courtship displays of the male. Some of these olive-green birds were possibly young males. We have already seen that males just beginning to acquire the adult colors perform persistently, and it is probable that they begin these exercises even before they have progressed far enough in the molt to be distinguished from the females. In El General in October I watched a Salvin's manakin in female plumage, but apparently a young male, 'dance' over a space between young saplings where there was never a bare court. Chapman (1935: 476) watched a *Manacus manacus*, at first taken to

be a female but later proved to be a young male, display in company with adult males in the forests of Trinidad.

On two occasions, however, I watched spirited displays given by female yellow-thighed manakins of whose sex there could be no doubt, because they attended a nest or a fledgling. One of these females had yellow eyes and was more than ordinarily attentive to her nest. When pushed from her eggs, this female performed the 'about-face', at the same time displaying her thighs, which were more yellow than is usual in her sex. As she flitted from perch to perch she sometimes audibly snapped her wings. Another female, found in the forest with a fledgling which had not been long out of the nest, about-faced and snapped her wings, giving once a snapping roll. She also darted rapidly back and forth between perches a few feet apart, in the manner of the courting male; and she uttered a loud, shrill, long-drawn whistle, much resembling that used by the male as he mounts the female. A supposed female, who late in May visited a male's display perch but would not submit to being mounted by him (see p. 9), was more demonstrative than the females I have seen actually accept the male's attentions.

It appears, then, that some of the courtship displays of the male are latent in the female and may find expression, at least in a somewhat subdued form, at times of great emotional stress, as when nest or offspring seems to be in danger.

NESTING

On Barro Colorado Island in 1935, I found six nests of the yellow-thighed manakin. On my farm in the Basin of El General, Costa Rica, at an altitude of 2500 feet above sea-level, I found three more nests during the seven years from 1942 to 1948, inclusive. Seven of these nine nests were placed between five and ten feet above the ground; the eighth was situated about 30 feet above the ground in the bough of a tree at the edge of a light-flooded opening in the forest, left by the falling of a tree; the ninth was about 20 feet up in the midst of the forest. Five of the nests on Barro Colorado Island were situated in the undergrowth of the forest. The sixth Barro Colorado nest and the lowest of the El General nests were in fairly tall second-growth woodland, not far from the heavy forest. Both of the unusually high nests were found in El General; they were at the greatest altitude above sea-level, as well as the greatest height above the ground, of all the nests of the yellow-thighed manakin that I have seen. In the valley of El General, this manakin tends to nest, as well as to display, at greater heights above the ground than on Barro Colorado. In El

General a congeneric species, the blue-capped manakin, is abundant in the forest undergrowth; possibly interspecific competition has resulted in the yellow-thighed species' seeking higher levels than it occupies on Barro Colorado, where apparently it is the only species of *Pipra*.

The nest is a very slight, frail structure suspended between the slender arms of a fork of a thin, horizontal branch. It is too shallow to be called a cup; perhaps 'hammock' is the term that best describes it. The delicate fabric is composed chiefly of fine vegetable fibers, usually brown in color, sometimes lighter. To the outer or lower surface is attached a variable number of small dead leaves or fragments thereof. Sometimes bits of the pinnae of ferns are used along with the leaves of dicotyledonous trees. Some nests have a complete covering of these dead leaves, others are so poorly covered that it is possible to see the eggs through the meshes of the bottom. The nest is bound to the supporting arms of the fork by cobweb and also by passing the fibers over the twiglets. One of the nests in El General contained the short, fine, curled secondary rachises of the twice-pinnately compound leaves of a climbing acacia, in addition to the usual fibrous material. A few slender black fungal hyphae, of the kind that creep over trunks and branches in the undergrowth of humid forests, are sometimes coiled into the bottom of the nest as lining.

The internal measurements of one nest were: diameter 1.75 inches, depth 0.63 inches. The depth of the nest is about equal to the transverse diameter of the eggs it holds, so that they reach to the level of the rim. The incubating female sits upon rather than in the nest. Her body is almost completely exposed, and were it not for her dull olive-green plumage she would be a conspicuous object while incubating and brooding.

It is usually possible to distinguish the nest of the yellow-thighed manakin from that of the other members of the family with which this species dwells in the Central American forests. In the first place, it is usually situated at greater heights than the nests of the blue-capped manakin (*Pipra coronata*), Gould's manakin (*Manacus vitellinus*) and Salvin's manakin (*M. aurantiacus*). The nests of these three species are rarely built much over five feet above the ground, which was the height of the lowest nest of the yellow-thighed manakin that I found. The frail, shallow hammocks of the species of *Manacus* are usually built of brown or bright straw-colored bast fibers and lack a covering of dead leaves on the outside. The nests of the blue-capped manakin resemble those of the yellow-thighed manakin in their covering of leaves, but this outer covering often contains also bits of green moss, which I have not seen in nests of the latter. There

is no possibility of confusing the thrush-like manakin's (*Schiffornis turdinus*) big, bulky nest of dead leaves with the delicate little structures built by *Pipra* and by *Manacus*.

NEST-BUILDING

On March 17, 1943, I found a recently started nest of a yellow-thighed manakin in a tall, second-growth woodland near the edge of primary forest in El General. It consisted of a few, small, dead leaves, fine petioles and much cobweb, suspended between the slender arms of a horizontal fork, ten feet above the ground. The female worked in a most leisurely fashion and building proceeded slowly. On March 19 I watched for two hours. From 7:10 to 7:50 a. m. the female brought material eight times. From 7:50 to 8:28 she remained out of sight. From 8:28 to 8:50 she came twice more, then again suspended her labors. She brought chiefly sheaves of the slender, bow-shaped secondary rachises of acacia leaves and cobweb but also long, light-colored fibers doubled in her bill. She was always alone; I did not see a male of her kind in the vicinity. With an audible whirr of wings, she would alight on a twig near her nest, look around carefully, flit to the nest to lay her material upon it, and then sit in it to give it shape. She was quite indifferent to my presence, although I sat on a rock close by without the least concealment. She was at all times silent. It was March 26, nine days after I found this nest, before I saw the first egg in it. The second was laid the following day.

A female which I watched build in the same locality on June 6, 1948, behaved in much the same manner. Her nest, about 20 feet up in a fork of a thin, horizontal branch of a tall and very slender young tree on a ridge in the forest, was close beneath the feathery frond of an Euterpe palm. When I found the nest at 7:55 in the morning the female was building actively, and during the next half-hour she brought material eight times. Each time she flew up with something in her bill she alighted on the supporting branch about two feet from the nest and paused there to look around carefully before advancing to her nest-site. Here, after placing her latest contribution, she carefully shaped the shallow cup with bill and feet. She was quite alone and perfectly silent. Her eyes were dark, and her bill was yellowish.

THE EGGS

I have records of eight sets of eggs, each of which contained two, a number which appears to be as constant among manakins as with antbirds and hummingbirds. In one instance, at least, several days intervened between the laying of the first and second eggs. On

March 11, 1935, I found on Barro Colorado Island a nest containing a single egg. The female was covering it and allowed me to approach within three or four feet before flying away. I revisited this nest on the afternoons of March 12 and 13, and on both occasions found the female absent and the egg cold. Believing that the nest had been deserted, I now neglected it and did not see it again until March 18, when to my surprise the female was covering two eggs. An interval of at least three days had separated the laying of the first and second eggs.

The eggs of the yellow-thighed manakin are dark grayish-buff, heavily mottled with brown, especially in a wreath around the thicker end. The measurements of eight eggs average 21.5 by 15.4 millimeters. The eggs showing the four extremes in size measured 22.2 by 15.9 and 21.0 by 14.3 millimeters.

My earliest date for eggs is March 10, when I found a nest with a completed but apparently newly-laid set on Barro Colorado Island. Two more nests with eggs were found on the island during the remainder of March, two in April, and the last of my six nests in this locality on May 7, when it held its full complement of two eggs. My three nests in El General were built in March, April, and June. March, April, and May are the months of greatest reproductive activity; but observations on the behavior of the males, and analogy with the habits of other species of manakins, suggest that the nesting-season is actually considerably longer than the foregoing nest records show it to be. Proof of this is furnished by a record kindly sent to me by Mrs. Dorothy Hobson, who on July 7, 1947, found a nest with two eggs on Barro Colorado. She sent me the empty nest as a check on identification.

INCUBATION

The eggs of the yellow-thighed manakin are incubated by the female alone. I made a great many visits to seven nests with eggs; I often saw the female sitting, but a male was never present. The males spend so much time in the courtship assembly that they could hardly be supposed to take turns on the eggs. With his bright red head, the male manakin would probably be fatally conspicuous as he sat upon the obscure little nest, which is difficult to detect amidst the dark shadows of the forest when the olive-colored female is sitting.

From a blind, I watched nest 1 for an entire day, nest 3 for the first six and one-half hours of a day. The female of nest 1 sat less faithfully than her neighbor of nest 3. During 12 hours I timed seven sessions on the eggs which ranged in length from 29 to 108 minutes

and averaged 65.1 minutes and an equal number of recesses ranging from six to 21 minutes in length and averaging 14 minutes. This manakin was on the nest 82.3 per cent of the 12 hours.

At 6:05 a. m. on March 22, while it was still dark in the forest, I entered the blind before nest 3. At 6:26 the female manakin flew from the nest for her first recess of the morning. At 6:52 she returned and incubated until 8:30. Returning again at 9:04, she flew directly onto the eggs, without first alighting upon the rim. Such a mode of entering the nest is customary with hummingbirds, but nearly all heavier birds come to rest first on the rim of the nest and then hop gently down to cover the eggs. The manakin now sat continuously until 12:38 p. m. Thus the entire morning was taken up by two long sessions of 98 and 214 minutes and two recesses of 26 and 34 minutes. The manakin incubated 83.9 per cent of the morning.

While sitting on the nest, the female from time to time regurgitated small seeds, held each in her bill for a few seconds, then allowed it to drop to the ground. From time to time she rose up to adjust the eggs beneath her. During her long session of three hours and 34 minutes, the bird on nest 3 preened her feathers while she sat. Both birds incubated in perfect silence.

Nest 3 was far from any courtship post of the males; but while sitting in the blind before nest 1, I could hear the calls of a male, and at times glimpse him on his slender, horizontal display perch at the end of a long vista through the foliage. He never came near the nest, and the female appeared to ignore his existence. Sometimes when she left the eggs he would call and snap his wings with renewed energy, as though he had seen her and was trying to attract her to his perch. At other times, while the female was at recess, he would leave his post and advance about halfway to the nest; once he displayed amid the underwood here; whether the female was with him I could not see. The position of this nest within sight of a male's display perch was probably only incidental and not significant of intimate relations between the female manakin and the male.

As she sits upon her tiny nest, the olive-green female yellow-thighed manakin is a most inconspicuous object. Upon the approach of danger she depends upon her immobility to escape detection. Most of the females that I found nesting permitted me to come almost or quite within reach of them before taking flight. At nest 1, the female allowed me to advance my hand to within a few inches of her before she darted from the eggs; it was not until after the nestlings hatched that she allowed me to touch her and to smooth the feathers of her back with a finger. At nest 2, the female also became bolder as incubation

proceeded and would sit until my advancing fingers were only a few inches distant from her. Then, unlike the other manakins, she would jump from the nest and flutter downward, to come to rest upon some low support only a few inches above the ground, where she spread and beat her wings. Although her actions somewhat resembled those of a bird that practices a distraction display, she did not appear to be feigning injury. Her act was never long continued; if I walked toward her she flew directly out of sight, instead of trying to lure me farther away from the nest by fluttering over the ground, as many birds do.

At nest 8 in El General, on the afternoon of the day the female laid her second egg, I came to look into her nest, ten feet above the ground, with a mirror attached to the end of a long stick. She remained on the nest while I stood below and watched her. Shaking the slender nest-tree did not cause her to desert her eggs. Only when I raised the mirror to the level of the nest and shook the foliage immediately surrounding it, would she leave and allow me to see what she had beneath her. Within a few minutes she was back on her eggs again.

But the most resolute of all the female yellow-thighed manakins—indeed, the most attentive to her nest of all birds of whatever kind that I have known—was the owner of nest 3 on Barro Colorado Island. This nest was situated ten feet above the ground in the fork of a thin, horizontal branch of a small bush. On the day it was found I tried to view its contents in a mirror, but no amount of shaking the bush, consistent with the safety of the nest it supported, would cause the bird to leave. I even touched her bill with the end of a stick. At length I went away without having seen what was beneath her.

I returned again and again, hoping to find the manakin absent, so that I might see what the nest contained without running the risk of molesting her unduly and causing desertion, but at every visit I found her sitting as before. Subsequent studies showed that she was present more than 80 per cent of the time. At last I came with a ladder resolved to see the contents of the nest. I climbed up, gently touched the manakin's tail with a finger, but she would not leave. I lightly smoothed the silky feathers of her back. Next I tried to push two fingers beneath her, in order to lift out an egg. It was not the weight of her tiny body that made her so difficult to raise; she was clinging to the nest with her feet. But finally she yielded and darted to a neighboring perch, where she turned to watch me.

Her departure revealed two eggs resting in the shallow depression of the nest. As I lifted one out to examine and measure it, the owner returned and hovered a few feet above my head, opened wide her bill revealing a yellow-lined mouth, and "screamed" at me. Her cries

drew two sympathizers. One was a bird even smaller than herself, a bent-billed flycatcher (*Oncostoma olivaceum*), which alighted a few feet away and uttered a peculiar, harsh, growling note, stretching forward and bending down its neck as it uttered its little scold. The other was a female hummingbird which hovered close around my head, then darted off through the forest. The growls of the little bent-bill seemed to irritate the manakin, for she darted at it and caused it to retreat.

I noticed that this female manakin was different from the others I had seen. Her eyes were yellow, like the males', and her plumage darker than usual in her sex, tending toward the black of the male. Her thighs were pale yellowish, and she exposed them as she darted and twisted around. She even about-faced a few times, flitting her wings and exposing her thighs as she did so, in the fashion of the male. As she flitted from perch to perch, she sometimes audibly snapped her wings. After a while the manakin left me to complete my notes. I returned half an hour later and found her sitting on her nest as before.

Thereafter, when I made my daily visit to this nest to learn whether the eggs had hatched, I did not hesitate to feel beneath the sitting manakin with a finger. The first time that I touched the end of her bill she attempted to bite, but afterward she never made a hostile move. I smoothed the feathers of her back with a finger, and she did not move even when I touched the top of her head. One day I came with two visitors to the island; the bird sat quietly while each in turn climbed the ladder and laid a finger gently upon her plumage.

On the evening of the day when her eggs hatched, this female manakin alighted on the rim of her nest just as I was approaching it with a ladder. When she noticed me coming she 'froze' there, remaining perfectly immobile while I set the ladder beneath her and climbed up. When I reached the top of the ladder my head was only a foot from her, and I could see the legs of a small spider sticking out of her bill. The nest was still a few inches above the level of my eyes, and as I pulled it down to look in, the manakin flew to the next tree.

Photographing this manakin was an unique adventure. She did not move while I screwed the camera to the tripod head (lashed to a ladder), although the lens was only a foot away from her. Then, since she was sitting with her tail toward the camera, I pushed her around until she sat with her side toward it. She sat through all the complicated business of focusing, adjusting the shutter, putting in and taking out the film-holders, while I made five time-exposures. She persisted in keeping her head turned away from the camera. To remedy this, I tried to turn her around until her head was toward the camera, for

the sixth exposure. This was too much; she darted from the nest. Later in the day she was at her post again.

The only accessible nest that I found before the eggs were laid was despoiled a few days after the set was complete. In nest 1, the eggs hatched 15 days after the nest was found with its full complement, but probably the eggs had already been incubated for a few days. In one instance I was able to determine the incubation period of a related species, *Pipra coronata*, and found it to be 19 days. Van Tyne (quoted by Chapman, 1935: 506) found the incubation period at one nest of *Manacus vitellinus* to be 19 days; and at two nests of *M. aurantiacus* that I studied in El General, the eggs hatched after this interval of incubation. It is likely that the period of incubation of the yellow-thighed manakin does not differ greatly from that of these other manakins.

THE YOUNG

On March 24, both eggs hatched in nest 3 and one of those in nest 1. The second egg in nest 1 hatched the following day. The newborn manakins had pink skin and bore sparse gray natal down of the usual passerine type. Their eyes were tightly closed, their bills light yellow. They developed slowly. When they were five days old, I noticed that their bills were turning black, their eyes were opening, and the pinfeathers were pushing through the skin. When eight days old they were still nearly naked, but the feathers were beginning to escape from the ends of their sheaths.

On April 2, when the two nestlings in nest 1 were respectively eight and nine days old, I watched them during the first four hours of the day. Their mother, who had brooded during the night, flew from the nest at 6:27 a. m. At 7:13 she returned to the nest-tree followed by a male, apparently the one whose display perch was in sight of the nest. For a few minutes both rested near the nest, but he showed no interest in it; then both flew away. At 7:33, more than an hour after she became active, the female gave the nestlings their first meal of the day. Then she remained standing on one of the supporting twigs at the edge of the nest for six minutes, at the end of which she went off again. At 7:48 she returned with nothing visible in her bill, which was, however, slightly open. She first came to rest on a branch about a yard from the nest, lingering there several minutes while she looked from side to side. Then she advanced to the nest, alighted on one of the arms of the supporting fork, and regurgitated many pieces of food, the nature of which I could not determine, placing some in the bill of each nestling. After receiving their meal, the nestlings voiced soft

little *peeps*, while their mother twice uttered a low, soft whistle. After lingering on the rim for several minutes, she entered the nest and brooded the nestlings, which were now so big and so completely filled the nest that she could hardly cover them. She brooded quietly for 52 minutes, from 7:51 to 8:43, then flew away.

At 8:54 she was back again and fed the nestlings alternately four times each, then flew away without brooding. At 9:10 she returned, alighted on a branch a yard from the nest, and rested there quietly for a quarter of an hour, as though guarding the nestlings. Then she advanced to the nest and began to feed. She regurgitated about ten objects in all, apparently small purple berries. The nestlings were satiated and sank back into the nest before she had exhausted the contents of her crop, and with a very low, twittering call she coaxed them to take more. Slowly they rose up to receive the remainder of the food. Then, after lingering four minutes on the rim of the nest, the mother flew away. At 9:58 she returned and regurgitated eight objects of food for the nestlings, then remained for two minutes standing quietly beside the nest before she flew off. She did not return before I left at 10:27. During four hours she had brought food to the nest only five times, but each time a liberal amount, which she divided rather equally between the two nestlings.

The female manakin did not once carry away the droppings of the nestlings, as nearly all passerine birds do. Instead of this, the nestlings voided their excreta over the side of the narrow nest, much in the manner of hummingbirds—a habit also of nestling blue-capped manakins and Salvin's manakins, after they are strong enough. The waste matter contained many small seeds, indicating that berries formed an important element in the young birds' diet. After his early morning visit, the male manakin did not return to the vicinity of the nest; to the female alone fell the entire task of attending the nestlings.

None of the seven accessible nests was successful. From three nests the eggs were lost before hatching; from three more, unfeathered nestlings disappeared. The seventh nest was deserted as a result of an ill-considered experiment in photography. Because of these repeated disasters, I was unable to follow the later development of the nestlings or to determine the period they remained in the nest. The nestling period of the related blue-capped manakin is 13 or 14 days; of Salvin's manakin, 13 to 15 or exceptionally 17 days.

On April 11, 1935, I found a female yellow-thighed manakin with a fledgling that was still somewhat fuzzy and certainly had not been many days out of the nest. It rested about 12 feet above the ground in the midst of the forest. While I watched, its mother behaved

most oddly, performing in a subdued form many of the antics of the courting male. She flew back and forth above my head, uttering repeatedly a loud, shrill, long-drawn whistle. She about-faced on a branch and snapped her wings, giving once a rolling snap. She flew briskly back and forth between branches on opposite sides of the fledgling, much as a male darts back and forth between his display perch and a neighboring twig. Sometimes she rested close beside her fledgling; but when I stood directly below it she vanished and remained out of sight as long as I stayed there. Her conduct contrasted sharply with that of female blue-capped manakins with fledglings; the latter flutter widespread wings and voice low, soft trills in an effort to draw the intruder away from their young by feigning injury.

Young male yellow-thighed manakins resemble the females in their olive-green plumage. On Barro Colorado Island in November, I saw a number of young males in olive-green attire but flecked with red on the head and hind-neck, who had taken up stations in the undergrowth of the forest and were practicing their courtship rites in a subdued form. There were at the same time males in full black, red, and yellow plumage, whose presence at this season weighed against the assumption that there was an annual change in coloration of the adult males in this species. At the end of March, I met among the forests of El General a young olive-green male, which had a single inconspicuous red spot on the back of his neck. His eyes were yellow as in the adult male. The earliness of the season made it unlikely that he had been hatched that year. Among most of the small passerine birds of Central America, the young males acquire the nuptial plumage of the adults at the postjuvenal molt. But these observations on the manakins make it seem probable that the young males go through the 'winter' in the juvenal plumage and take on the adult colors by means of the prenuptial molt—if they do not indeed pass a whole year or more in the juvenal attire, in the manner of the sharp-tailed manakin and the cock-of-the-rock.

SUMMARY

1. The habits of the yellow-thighed manakin (*Pipra mentalis*), including courtship and nesting, were studied on Barro Colorado Island, Canal Zone, and in the valley of El General, Costa Rica.

2. These manakins inhabit primary rain-forest, in which they range vertically from the bushy undergrowth to the lower boughs of the dominant trees. Rarely, they enter adjoining areas of taller second-growth woodland.

3. Their food consists of insects and other small invertebrates, which

they usually catch by darting up to the foliage or twig on which the creature is crawling and plucking it off, without alighting. They consume also many berries. They join the motley throng of birds which follow army ants and prey upon small creatures.

4. These manakins do not form pairs. To the female alone fall all the duties of the nest; while from December through May, and possibly longer, the males spend their time advertising their presence in definite spots. The display perch of the male is a slender, more or less horizontal branch, free of lateral twiglets and foliage for a distance of several feet, and unobstructed by surrounding vegetation. This is situated amidst the forest at heights ranging from 15 to 50 or rarely as much as 70 feet. Usually a number of displaying males associate together to form a courtship assembly, which may contain up to five individuals, whose display perches are from 20 to 125 feet apart.

5. The courtship performance of the male includes a variety of vocal sounds; mechanical noises, chiefly a loud *snap* and a rapid series of *snaps* produced by the wings; and an amazing variety of acrobatic stunts, an outstanding feature of which is the display of the lemon-yellow thighs by stretching up the legs.

6. The actions of the male when a female arrives on his display perch are described in detail. While a female is being courted by a male, other males of the assembly perform at an accelerated pace but remain aloof from their rival's display perch. The mating, so far as seen, was always consummated on the display perch.

7. Males respect the privacy of each other's display perches, and no infraction of territorial rights was witnessed. During the quieter periods in the courtship assembly, two males often visit each other on some twig about midway between their display perches. Here they remain perched close together for considerable periods, often practicing the courtship antics in a subdued form. Each in turn may 'court' the other but never with the intensity of a male addressing a female. Some males spend a large share of their time in the assembly perching by twos; others stay more constantly alone on their own display perches. The latter are more successful in attracting the females.

8. Young males in the olive-green juvenal plumage, merely flecked with red on head and hind-neck, were seen practicing courtship antics in November.

9. On the male's display perch the female plays a largely passive rôle. But at other times, especially when nest or offspring seem to be in danger, the female may under emotional stress perform, in a somewhat subdued manner, many of the courtship antics of the male,

including the about-face and wing-snapping. The courtship habits of the male appear to be latent in the female.

10. Six nests were found on Barro Colorado Island and three in El General. Those on Barro Colorado ranged from five to ten feet above ground, those in El General from ten to 30 feet. In the latter region, where *Pipra coronata* is abundant in the undergrowth of the forest, *P. mentalis* tends to display and to nest higher in the trees than on Barro Colorado, where no congeneric species was seen.

11. The nest is built by the female alone, unattended by a male. The slight, shallow hammock is hung in a crotch at the end of a slender, horizontal branch. Small leaves or fragments thereof, attached to the lower side, serve to distinguish it from nests of species of *Manacus*. It appears always to lack the green moss often attached beneath nests of *P. coronata*.

12. Each of eight nests contained two eggs. Eggs have been recorded from early March to early July.

13. The eggs are incubated by the female alone. A constant sitter, she may stay on the nest for three and one-half hours without interruption. One female covered the eggs for 82.3 per cent of 12 hours, another for 83.9 per cent of six hours.

14. Depending upon their minute size and dull color to escape detection, females remain immobile upon the nest and permit a close approach by man. Not infrequently one can touch them with a finger. One extraordinary female, which had yellow eyes like the males, permitted the author to feel her eggs beneath her and when photographing to push her around on the nest into the desired pose.

15. Newly hatched nestlings are blind, helpless, and have sparse natal down. They are fed and brooded by the female alone. Their food, consisting of small insects, spiders, and many berries, is brought to the nest partly in the mother's mouth but chiefly in her throat or crop—sometimes ten articles at once—and delivered to the nestlings alternately as regurgitated. After the young are strong enough, they void their droppings, which contain many seeds, over the side of the nest, and the parent no longer carries them away.

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VARIATION IN *DUMETELLA CAROLINENSIS*

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CURSORY examination of the specimens of the catbird, *Dumetella carolinensis* (Linnaeus), in the Chicago Natural History Museum showed that, on the whole, western specimens appeared lighter below than eastern specimens, an arrangement that agreed with Aldrich's recent description of a western race *ruficrissa* (Proc. Biol. Soc. Wash., 59: 132, 1946). However, several birds from the eastern seaboard were as pale as birds from the far west, and a more critical examination was necessary to determine the type and extent of variation within the species. This examination shows that although western birds average generally paler, there is no simple cline from east to west and the population from west of the great plains is not sufficiently distinct to be separable.

TABLE 1

	Dark				*Pale*	
	1	*2*	*3*	*4*	*5*	*6*
Massachusetts		1	1			
Connecticut	1	1	4	2	1	
North Carolina					1	
South Carolina					1	1
Georgia				1		1
Mississippi	2	1		1		
Texas		1		1		
Tennessee	1					
Illinois	4	2	2	3		
Wisconsin	2	3				
North Dakota		1	1	1	2	
Saskatchewan				1	2	2
Colorado			1		1	1
Montana					1	
Idaho			1		1	1
Alberta						1
British Columbia						2
Washington						1

Sixty breeding birds were available for analysis from all parts of the range. These specimens were laid out in a single graduated series, with the darkest birds on one end and the palest at the other. The color of the underparts was used as a criterion, rather than the color

of the crissum. There is a fair correlation between the two, but the latter is more subject to change with age, and is less constant, than the former. The result was a series with so gradual a change from dark to light that at first glance it appeared homogeneous. For simplicity of analysis the series was broken down into six groups of ten birds each, and tabulated by locality.

A study of Table 1 reveals that there is not a simple cline from east to west but that three populations are involved. There is a pale western population, Washington to North Dakota; a dark central population, Wisconsin to Mississippi and Texas; and an intermediate eastern seaboard population, Massachusetts to Georgia. The morphologically intermediate population is not, as might be expected, intermediate geographically, but is found at the eastern extremity of the range.

The data may now be more conveniently grouped (Table 2) by populations rather than states, and analyzed to see if any one of the populations may be separated from the other two. The brackets enclose the 75 per cent darkest or lightest in each population.

TABLE 2

	Dark →					*Light*
Eastern	1	2	5	3	3	2
Central	9	7	2	5		
Western		1	3	2	7	8

Table 2 shows that using the strict convention that 75 per cent of one population must be separable from 100 per cent of another for a subspecies to be considered valid none of the populations can be separated. Even with the debated convention that 75 per cent of one population be separated from 75 per cent of the other, the western could be separated from the central, but neither from the eastern.

The proposition advanced by Aldrich (*op. cit.*) that the eastern and central birds are separable from the western birds is illustrated in Table 3.

It is apparent that 75 per cent of the darkest birds of the eastern and central populations are not separable from 100 per cent or even 75 per cent of the lightest birds of the western population, and the groups are not separable in a taxonomic sense.

This seems to be a case where names can not be applied, but the trend must be stated in words; the central population tends to average darkest; the western population lightest, and the eastern one intermediate.

TABLE 3

Central and Eastern	10	9	7	8	3	2
Western		1	3	2	7	8

Although the color characteristics of the three populations are not sufficiently pronounced to permit naming of different races, they can be used to determine the breeding ranges of different wintering populations. For this purpose the data in Table 2 can be more conveniently grouped into three catagories, dark, medium and light.

TABLE 4

	Dark	*Medium*	*Light*
Eastern	3	8	5
Central	16	7	0
Western	1	5	15

Seventy-seven specimens of wintering birds were compared directly with the "color scale" of breeding birds, and placed in the appropriate categories. Three wintering populations were analyzed: Florida; the West Indies, including the Bahamas, Cuba, and Jamaica; southeastern Mexico and Central America. These data are summarized in Table 5.

TABLE 5

	Dark	*Medium*	*Light*
Florida	1	10	5
West Indies	6	19	7
Southeastern Mexico and Central America	0	16	13

Birds from Florida and the West Indies fit the pattern of the eastern seaboard population quite closely, and almost certainly represent that group. The range of color intensity of the southeastern Mexican (Veracruz, Oaxaca, Tabasco, Campeche and Yucatan) and Central American specimens does not fit closely that of any of the three breeding populations, but is nearer to that of the eastern birds, though lacking any dark specimens. This indicates that the eastern population also migrates to eastern Mexico and Central America in winter, probably by way of the Yucatan peninsula where catbirds are found in large numbers in October.

The wintering range of the central population is presumably along the gulf coast from Mississippi to Texas, a region from which we have no wintering specimens. The western bird presumably winters in the southwestern states and western Mexico.

The above analysis suggests a method of determining the breeding range of wintering populations, even though it is hopeless to identify individual specimens. Almost any specimen of catbird can be matched by individuals from any part of the breeding range of the species. It is only by studying adequate samples of migrating or wintering populations that one can determine what their breeding area was.—*Chicago Natural History Museum, Chicago, Illinois, July 22, 1948.*

RED BOB-WHITE—A REPORT AND CORRECTION

BY LEON J. COLE, HERBERT L. STODDARD AND E. V. KOMAREK

IT is a curious fact that among the earliest bob-whites described was one exemplifying the rare red phase of the species, which even today is known from relatively few specimens. The original habitat was given as "South America; locality unknown," but Gould (1843) recognized its closeness to *Colinus virginianus*, and whereas he described it as a distinct species, which he called *Ortyx castanea*, it has been generally considered an aberrant form of *virginianus*. Aldrich (1946: 497) goes so far, on the basis of measurements, as to put it in the subspecies *marilandicus*, and suggested Boston, Massachusetts, as a suitable type locality.

In his 'Monograph of the Odontophorinae' (1850), Gould republished his original description of this bird, adding a few remarks and a colored plate. Gould had only the one specimen which he obtained from the collection of the Zoological Gardens at Manchester, and which he showed in two positions. It is of interest to us because, in addition to the general rich chestnut coloring of the body, the forehead and throat of the type are black, while the under sides have more black than *virginianus*. The crop patch found in most of the red birds appears to be absent.

No special mention appears to have been made of this red quail for some time, though it would be surprising if it had not been taken by hunters from time to time. E. W. Nelson was especially interested in them, and Aldrich (1946) gives a few early records from various parts of the country, all of which fall, however, within the range which he ascribes to the subspecies *mexicanus* and *marilandicus*—that is, the northern part of the specific range of *C. virginianus*. The earliest

record is of an adult bird taken by M. W. Greenwood at Bethel, Ohio, in 1874, which is now mounted in the Curier Press Club collection of the Cincinnati Society of Natural History. Following that, there is a long gap to January 15, 1921, when an adult female, now in the U. S. National Museum, was taken by H. T. Gouldman in southern King George County, Virginia, and two specimens were shot by H. Mackay, January 24, 1933, on his game preserve in Guilford County, North Carolina.

Attention was brought to the red quail by the considerable numbers which occurred in the succeeding years on the Hobart Ames Plantation at Grand Junction, Tennessee. According to C. E. Buckle (1927), at that time manager of the Ames Plantation, these birds were first noticed in 1925, for he says: "We have known for two years that there were several red birds in this bevy." Apparently the birds came to the attention of E. W. Nelson in the fall of 1926, for he notes in a manuscript that there were at that time "six or seven in a covey of about 15 to 20 birds" (Aldrich, 1946). Buckle sent the same information to the Cooperative Quail Investigation (Stoddard, *in litt.* Feb. 17, 1927). In the April, 1927, issue of 'American Field,' Buckle published a brief but very excellent account of the Ames birds up to that time. In succeeding years the red quail increased and spread, so that Stoddard (1931) reported that "no less than one to five have been noted in seven different coveys, distributed over several square miles, some of them being fully four miles from where the variation was first noted." Dr. Herbert Friedmann, of the U. S. National Museum, early became interested in the problems presented by the Ames birds and coöperated in many ways in initiating our studies and experiments.

One of the early specimens taken by Mr. Ames is depicted by Stoddard in his colored plate (1931: 18). From the genetic standpoint, the red coloration was of particular interest, for if it should prove upon breeding to behave as a sex-linked character it could possibly be comparable to the red coloration in pigeons which Cole and Kelly (1919) had attributed to what they called the A-factor. This was taken up with Mr. Ames, who gave a half-dozen of the red birds with which to make the test in 1930. The experiment was carried on with the coöperation of the Poultry Department at Madison, Wisconsin, and the breeding experiments were conducted by M. O. North, under the general direction of L. J. Cole. Due to inexperience with bob-whites and to various misfortunes, meager data were obtained, and the experiment was terminated by rats. The results, as far as they went, seemed to favor the interpretation of the character as sex-linked, and this was reported briefly and tentatively (Cole and North, 1931). What ap-

peared to be the critical mating was of normal male to red female, from which eleven chicks were obtained; the four red ones were males and the seven normal ones, females. The sex of one red and two normal chicks could not be determined. Only two eggs were fertile in a reciprocal cross (red male and normal female), and two normally colored chicks were obtained. Sex of these chicks could not be determined, but they indicated, at least, that the male was heterozygous.

TABLE 1

LIST OF MATINGS MADE IN STUDY OF INHERITANCE IN RED QUAIL

	Experiment	Male	Female	Eggs	Infertile or died in egg	Red	Color Intermed.	Normal
1934	A	Red (H. Ames-963)	Red (H. Ames-953)	57	13	44		
1934	B	Red (H. Ames-851)	Normal	74	6		68	
1934	C	Normal (L. S. T. 32-1251)	Red (H. Ames-893)	52	5		47	
1935	D_1	Red (from A)	Inter. (from C)	25	8	6	7	1
1935	D_2	Red (from A)	Inter. (from B)	35	8	19	2	
1935	E	Inter. (from B)	Normal	71	8	14	11	15
1935	F	Inter. (from B)	Inter. (from C)	86	44	26	2	8
1935	G	Inter. (from B)	Inter. (from B)	60	33	16	5	4
1935	H	Inter. (from C)	Inter. (from C)	51	26	9	6	5
1936	I	Normal (from E)	Normal (from E)	41	16			25
1936	J	Inter. (from E)	Inter. (from E)	28	15	3	5	5
1936	K	Normal (from E)	Normal (from E)	37	37			
1936	L	Red (from A)	Inter. (from C)	54	14	11	29	
1936	M	Inter. (from E)	Inter. (from B)	23	2	6	11	4

It was obvious that these experiments needed to be repeated and extended before any definite conclusions could be made. Accordingly the experiment was set up with headquarters at Sherwood Plantation, near Thomasville, Georgia, as mentioned in the report of the Coöperative Quail Study Association (Stoddard, 1935: 18). The data were assembled principally by Komarek with supervision by Stoddard. It was soon found that there was a high correlation between the coloration of the chick and that of the adult, so the numbers which could be recorded were much greater than before, and over a hundred skins were saved for later reference. The experiments set up in 1936 were consistent and unequivocal in showing that the assumption of sex-linkage was wrong, but they were continued two more seasons to get further results. Finally, the three authors have had opportunity to go over the accumulated records and specimens together.

The results of the first year showed that the four birds received from Mr. Ames were all homozygous (Table 1). When mated together, 963 and 953 (Experiment A) produced a relatively uniform lot, distinguishable from the heterozygous chicks in B and C (Plate 2). The young of A were all of a deep chocolate red, usually more dusky on the

throat, while the downy young of B and C had a warmer cast and a wren-like or grizzly appearance due to indistinct barring. On the whole the birds of C seemed a shade lighter than those of B, but this did not hold for individual comparisons.

TABLE 2

MATINGS GROUPED ACCORDING TO ASSUMED GENOTYPES INVOLVED

Group	*Genotype*	*Homozygous dominant*	*Heterozygous*	*Homozygous recessive*
a	A (RR x RR)	44 (16♂ : 18 ♀) (44)		
b	D-1	6 (3♂ : 2 ♀)	7 (2♂ : 4 ♀)	1[1] (1 ♀)
	D-2	19 (1♂)	2	
	L	11	29	
	(RR x Rr)	36 (37)	38 (37)	
c	B		68 (13♂ : 14 ♀)	
	C		47 (16♂ : 16 ♀)	
	(RR x rr)		115 (115)	
d	F	26[2] (2♂ : 2 ♀)	2	8 (2 ♀)
	G	16[2] (4♂)	5 (3 ♀)	4 (1♂)
	H	9 (4♂ : 1 ♀)	6 (2♂ : 3 ♀)	5 (1♂ : 1 ♀)
	J	3	5	5
	M	6	11	4
	(Rr x Rr)	60 (28.75)	29 (57.5)	26 (28.75)
e	E (Rr x rr)	14[1] (1♂ : 1 ♀)	11 (2♂ : 3 ♀) (20)	15 (3♂ : 2 ♀) (20)
f	I (rr x rr)			25 (25)

[1] None expected in class.

[2] Many of the birds in this class obviously belong in the heterozygotes, but it was impossible to make phenotypic classification.

Stoddard (1931: 87) has called special attention to the albinistic spots which accompany this erythrism in the bob-white, and to the similar markings in Cory's least bittern, which is undoubtedly a comparable red color phase of the least bittern (*Ixobrychus exilis*). The white spots show in the down as well as in the white feathers that mature later in the same areas. These crop patches, as they were called from their position, while variable in size involving from three or four feathers to as many as 20, were nearly always associated with the gene for red. The size of the spots seemed to vary independently of whether the bird was homozygous for red or heterozygous, and more rarely the spot was entirely lacking, at least in the adult bird. These crop patches, however, do not occur in birds recessive for this factor.

When the homozygous red is mated with the intermediate (b, Table 2), equal numbers of the two classes are expected. That they came so close is probably due to chance rather than to accuracy of classification. The one recorded as recessive does not belong in this class and is probably an error of some sort.

In the class (d) which should give one-quarter recessive, on the assumption that we are dealing with a simple case, the actual number recorded is remarkably close. In the other classes, however, the numbers should be just about reversed from what they are. It is obvious that too many are recorded as homozygous red when they should be heterozygous. In some cases these were separated into darker red and lighter red, showing variability, but they were necessarily described under different conditions, and therefore a reliable classification was impossible.

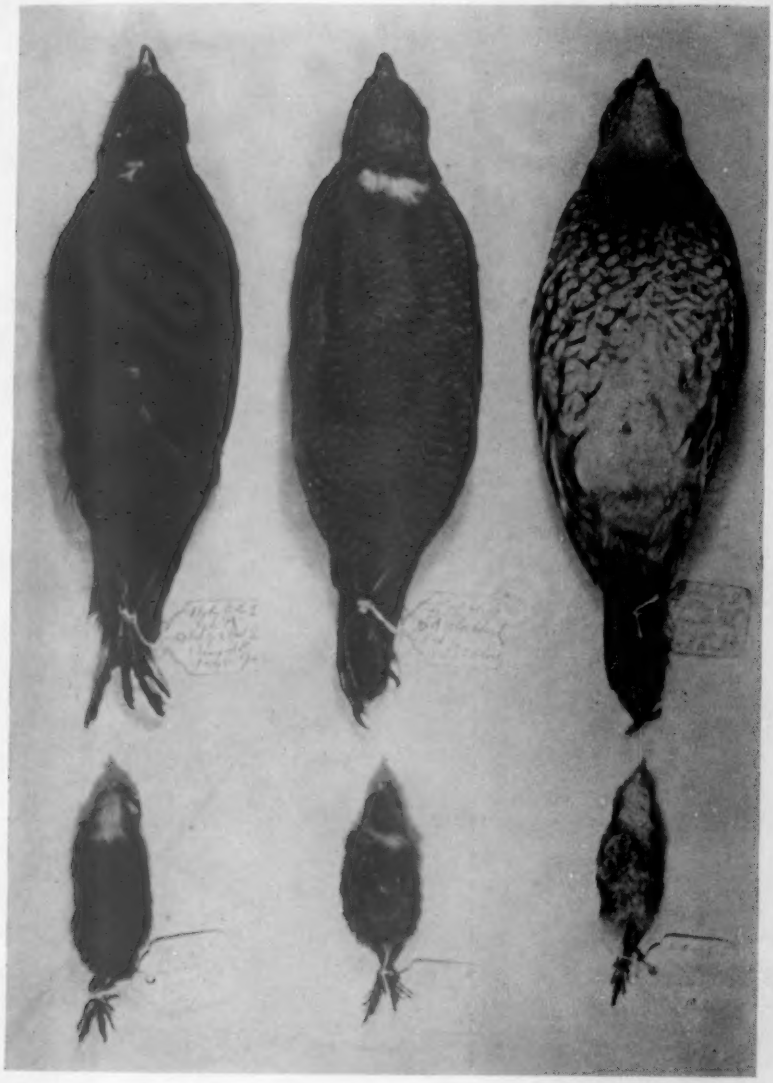
For the same reason it is possible that all the red chicks in the next experiment (e) were intermediate and that they were recorded as dark red because exact discrimination was not practiced at this stage of the investigation. All the skins saved of both young and adults proved, when examined later, to be of the intermediate class.

The recessive is easy to distinguish, and in Experiment 1 (group f) all the young were normal in spite of the fact that they had an intermediate grandparent.

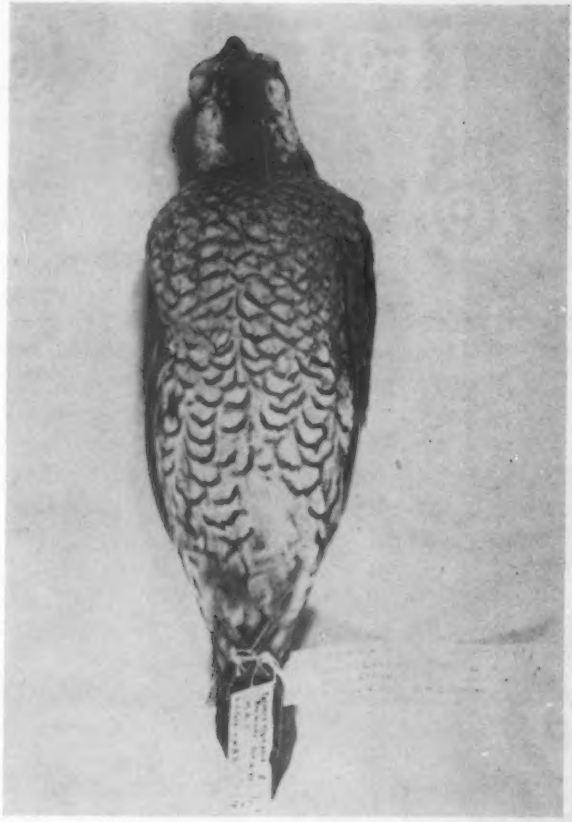
Stoddard (1931) lists a number of variations that are occasionally found in bob-whites, in addition to the differences that distinguish the various subspecies from one extreme of range to the other. One of the commonest of these is a tendency towards albinism, which occurs in a good many individuals, and has led to reports of "white" coveys of bob-whites. There is a color phase of the Japanese quail (*Coturnix coturnix japonica*) which has long been bred (Shimakura, 1940). It is known as "brown-splashed white" and is commonly smaller, less active, and less fertile than the normal. Constantly, the "splashed" behaved always as homozygous for a single Mendelian, autosomal, recessive gene.

We have notes made a good many years ago of a beautiful bob-white taken in Maryland in 1846, and now in the collection of the U. S. National Museum. This bird appears normal in marking except that there is no black, which is replaced by reddish brown.

The throat of the adult male is normally a shining, clear white, but examples are occasionally found with a saffron tinge, much as in the female (Stoddard, 1931: Pl. 18). This is quite likely associated with some hormonal condition, but what part heredity takes, if any, has not been demonstrated. On the same plate is shown the incursion of



BOB-WHITE QUAIL: BIRDS AT LEFT, BOTH ADULT AND CHICK, ARE HOMOZYGOUS FROM EXPERIMENT A. THE ADULT IS A FEMALE WHICH DIED AT ABOUT 101 DAYS OF AGE ON SEPTEMBER 30, 1934; THE CHICK, A FEMALE, DIED SEPTEMBER 9, 1934, AT FIVE DAYS OF AGE. IN THE MIDDLE IS A HETEROZYGOUS INTERMEDIATE FROM EXPERIMENT B (RED ♂ X NORMAL ♀). IT DIED OF BLACKHEAD, SEPTEMBER 15, 1934, AT 93 DAYS. THE INTERMEDIATE CHICK FROM THE SAME EXPERIMENT WAS FOUR DAYS OLD WHEN IT DIED. THE NORMAL FEMALE AT THE RIGHT WAS TAKEN AT TALL TIMBER PLANTATION, LEON CO., FLORIDA, ON JANUARY 15, 1932. THE NORMAL CHICK IS A MALE PREPARED ON SHERWOOD PLANTATION, JULY 10, 1934.



BLACK-THROATED BOB-WHITE MALE: COLLECTED AT MICHIGAN AGRICULTURAL COLLEGE BY L. J. COLE AND W. B. BARROWS, OCTOBER 16, 1897 (UNIVERSITY OF MICHIGAN MUSEUM OF ZOOLOGY, NO. 1083z).

black into the white throat patch, which is fairly frequent and varies greatly in extent. Covert (1898) mentioned a bird taken at the Agricultural College in Michigan and now in the collections at the University of Michigan, which had an extensive amount of black (Plate 3) on the throat and conspicuous black edgings on the breast and belly feathers, giving a distinctly scaled appearance. It will be recalled that Gould's bird (1850) had an excess of black and was also markedly chestnut. Nothing is known as to the inheritance of this condition, but apparently it may occur independently of the 'red quail.'

DISCUSSION

The 'red quail' condition is apparently an incomplete dominant which has cropped out several times within the more northern part of the range of *Colinus virginianus*, but nowhere, except possibly at Grand Junction, Tennessee, has it shown any tendency to persist. There was an effort there from early times to protect these birds, and this was supplemented by experiments to propagate them. The selection of the darker red birds in this work undoubtedly increased the proportion of homozygotes. We have no evidence that there was any natural tendency for selection on the basis of color. Both at Grand Junction and in Georgia, banded red quail that had been released as adults appeared in a few instances from five to 35 miles away, apparently having the propensity for occasional wandering that is usual in artificially propagated bob-whites. Dr. L. C. Morley of the Biological Survey, in making tests for bacillary white diarrhea, found that the reds bled more easily than the normals; the veins in the wing seemed to stand out more, and the blood spurted much more easily. The birds also appeared weaker than the normal individuals and would struggle less. If there is a negative population pressure working against the reds, they cannot be expected to maintain themselves indefinitely without help.

The adult breeding stock furnished by Mr. Ames for the Wisconsin experiments of 1930 were artificially reared on his plantation at Grand Junction, Tennessee, from adult red quail trapped in the wild on his place. Likewise the birds he furnished for the later experiments in Georgia were from artificially reared stock. In neither case is it known just how the matings were made that produced this foundation stock, though we were informed that the darker reds were selected for breeding stock as a general practice.

In the Georgia experiments, the breeding coops containing the red birds were placed with, and handled uniformly with, a large number of

coops used for the production of normally colored bob-whites that were being propagated for both experimental purposes and for release in the wild. Consequently a direct comparison of the hardiness and disease resistance of the red birds and the normally colored ones was possible. It was found that the reds lacked the vigor of the normal birds, their egg fertility was much lower, and their mortality rate both before and after hatching was much higher. In a letter of May 26, 1936, Hobart Ames stated that in his propagating plant: "We have always had more difficulty raising red quail than ordinary quail."

Two attempts were made to establish the red birds by releasing artificially propagated adults in ideal surroundings on two great quail preserves some 12 miles apart in Leon County, Florida. Four pairs of mated red birds, which had started the production of eggs, and one extra female were released on Sunny Hill Plantation, April 21, 1939, and an equal number (three males and six females) were liberated on Forshala Plantation the next day. In neither case was a 'center' of the red birds established, and only one unbanded red quail from the former appeared in the bag of quail during subsequent seasons to indicate that breeding had been successful. One red pair built a nest and laid several eggs near the release point on Forshala Plantation, but this nest was destroyed by a predator.

Several red quail were likewise liberated, or escaped, on Sherwood Plantation during and after the experiments, but no reds were seen there after a couple of years.

Artificially propagated red quail have been liberated on the Ames Plantation in large numbers, some years as many as three or four hundred, from the beginning of the work there until 1945, without their becoming very numerous in the region or on the plantation. In this connection R. H. Scott, present manager of the plantation, in a letter written on June 9, 1947, states: "Answering your question as to whether the red birds could maintain their numbers on the Plantation without being replenished with the artificially bred red birds, would say that they could not. . . . Up until two years ago, we have turned loose as high as four hundred of these Red Quail a year and we are sorry to say that we were unable to find [more than] very few of them during the shooting season." This, however, does not appear particularly surprising now, as abundant evidence has accumulated that artificially propagated quail seldom establish themselves and thrive after release in the wild. There is every reason to believe that this strikingly beautiful color phase will remain a rarity in the wild in the future, as it has been in the past.

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Department of Genetics, Wisconsin Experiment Station, Madison, February 18, 1948.

DISTRIBUTION OF THE RACES OF THE SWAMP SPARROW

BY W. EARL GODFREY

SINCE the description of *Melospiza georgiana ericrypta* by Oberholser (1938), the distribution of this subspecies has not been well understood, a state of affairs which is reflected in the vernacular name it has borne, western swamp sparrow. Its breeding range was outlined by Oberholser as "Alberta and Manitoba south to North Dakota" and quoted in the Nineteenth Supplement to the A. O. U. Check-list (1944). First published suspicion of its breeding in the east was that of Aldrich and Nutt (1939) who noted that a small series of breeding birds from Newfoundland was intermediate between *georgiana* and *ericrypta*. Later Peters and Burleigh (1945) definitely referred a more adequate Newfoundland series to *ericrypta*. Earlier, Braund and McCullagh (1940) referred birds from Anticosti Island, Province of Quebec, to *ericrypta* and suggested a probability that this race might be found to have an unbroken breeding distribution east across the northern part of the species' range.

In the course of identifying the swamp sparrows in the National Museum of Canada, the writer has examined 260 specimens of this

species from eight provinces and five states, including 127 adults in breeding plumage (June–July). To Mr. L. L. Snyder and the Royal Ontario Museum of Zoology, the writer is especially grateful for the loan of a splendid series of 88 specimens, mostly breeding birds from Ontario. Mr. Snyder's own identifications were pencilled on the labels of these, and it is both a pleasure and a reassurance to note that my own interpretations agree so closely with his. Thanks are due also to Dr. John W. Aldrich and to Dr. Herbert Friedmann for the loan of specimens from the United States National Museum (Biological Survey Collection), and to Mr. Hoyes Lloyd and Mr. J. Dewey Soper for material from their respective private collections.

Melospiza georgiana ericrypta Oberholser. Northern Swamp Sparrow.

In this moderately well-marked race, breeding adults differ from *Melospiza georgiana georgiana* in their paler upper parts, the browns of back and rump averaging grayer, the pale dorsal feather edgings whiter and apparently broader. Autumn specimens of *ericrypta* are distinguishable by their paler dorsal and rump coloration, and by the paler feather edgings of the back which provide more contrast with the black dorsal streaking than in *georgiana*, which averages darker and duller above. In juvenal plumage the differences are somewhat less obvious but *ericrypta* averages paler.

The breeding range of *Melospiza georgiana ericrypta* may now be outlined as follows:

North to central Mackenzie (Fort Rae), northern Saskatchewan, northern Manitoba, northern Ontario, central Quebec (Lake Mistassini and Moisie Bay), and northern Newfoundland; east to eastern Newfoundland; south at least to northeastern New Brunswick (Youghall, near Bathurst, and Miscou Island), Quebec (Lake St. John, Pointe au Mourier, probably Gaspe peninsula), central Ontario (Lake Abitibi, Kapuskasing, Chapleau, Pancake Bay, and Rainy River district), northern Minnesota (probably), North Dakota, central Saskatchewan, and south central Alberta; west to central eastern British Columbia (Peace River district).

June and July adults of *ericrypta* were examined from the following localities:

ALBERTA (Lac la Nonne, 4; Belvedere, 1; Wood Buffalo Park, 1; Peace River Landing, 1). MANITOBA (Anola, 1; Lake St. Martin, 1; Reader Lake, 2; Dauphin, 2; Bird, 2; Clear Lake, 3; Ilford, 1; The Pas, 1; Shoal Lake, 3). ONTARIO (Favourable Lake Mine, 2; Lac Seul, 2; Chapleau, 1; Amyot, 1; Off Lake and Big Fork, Rainy River district, 3; Savanne, 2; Wabigoon, 1; Lake Nipigon, 2; Lake Abitibi, 4; Kapuskasing, 2; Fraserdale, 1; Genier, 1; Moosonee, 3; Moose Factory, 1; Moose River mouth, 4; James Bay west coast, 5; Fort Albany, 3; Carling Lake, 1; Pancake Bay, 1; Rossport, 1; Peninsula, 1). QUEBEC (Pointe au Mourier, 1; Moisie Bay, 3; Havre St. Pierre, 2; Lake St. John, 8; Lake Mistassini, 13). NEW BRUNSWICK (Youghall, near Bathurst, 1; Miscou Island, 4).

Breeding specimens of *ericrypta* examined from the prairie provinces, from the east coast, and from northwest-central, north-central, and northeast-central Ontario are very uniform. However, certain trends, apparently geographical but evidently not sufficiently well-marked or so consistent as to be of subspecific status, are apparent within the range of *ericrypta*. Thirteen breeding birds from Lake Mistassini and eight from Lake St. John, Quebec, while unquestionably much nearer *ericrypta* than to *georgiana*, average slightly redder than the western series and show slightly heavier black dorsal streaking. A series of 17 from James Bay are interesting in averaging darkest of all specimens of *ericrypta* examined. Birds from farther south, however (Fraserdale, Genier, and Lake Abitibi) are perfectly typical *ericrypta*.

A single male from Manitoulin Island, Ontario (Perivale, June 17, 1938, R. O. M. Z.) is indistinguishable from *ericrypta*, and additional material might extend the known breeding range of this subspecies slightly southward from Pancake Bay. However, single birds from near-by Laird and Maclennan, while intermediate, are nearer *georgiana*. No breeding material was available from the Gaspé peninsula, but early June specimens from Miscou Island, northeastern New Brunswick, while somewhat intermediate, are nearer *ericrypta*. A male from Youghall, New Brunswick northeastern mainland, is certainly referable to *ericrypta*. Only a single breeding specimen was examined from Nova Scotia (Yarmouth, June 9) but this seems to be *georgiana*. However, six Nova Scotia migrants are all *ericrypta*, four of them early September specimens from Cape North, Cape Breton Island, which suggest a possibility that *ericrypta* may breed at least on the north side of that island.

The extensive breeding grounds of *ericrypta*, outlined above, obviously produce large numbers of migrants which must pass through southeastern Canada and eastern United States in larger numbers than the records indicate. In this connection it is of interest to point out that Wetmore (1940) has recorded it numerically almost equal to *georgiana* in migration through Kentucky, West Virginia, and Tennessee.

Migrant examples of *ericrypta*, from outside its known breeding range, have been identified by the writer as follows:

BRITISH COLUMBIA (Yahk, September 12, 1929); SASKATCHEWAN (Craven, September 11, 1937; Cabri Lake, September 10, 1920). ONTARIO (London, September 16, 1886; Ottawa, October 18, 1935; Rondeau, October 15, 1889; Pottageville, York County, April 27, 1932; Barrie, May 8, 1925; Toronto, May 10, 1891, May 12, 1898, May 11, 1935; Strathroy, May 9, 1928). QUEBEC (Meach Lake, Gatineau Park,

September 28, 1935). NOVA SCOTIA (Cape North, Cape Breton Island, September 5, 6, 11, 1935; Frizzleton, October 6, 1935; Black River, near Wolfville, May 23, 1907). NEW YORK (Cayuga, May 9, 1914). INDIANA (Winona Lake, October 4, 1913). MICHIGAN (Detroit, April 15, 1906; September 30, 1906; October 2, 1904, October 8, 1905).

Melospiza georgiana georgiana (Latham). Southern Swamp Sparrow. June–July specimens of *Melospiza georgiana georgiana* have been examined from the following localities:

ONTARIO (Long Point, Norfolk County, 3; Port Sydney, Muskoka, 3; Hallowell, 2; Kingston, 1; Laird, 1; Maclennan, 1; Biscotasing, 2; London, 2; Pottageville, York County, 2; Toronto, 1; Eganville, Renfrew County, 1). QUEBEC (Kazabazua, 1). NOVA SCOTIA (Yarmouth, 1). PENNSYLVANIA (Black Swamp, Lawrence County, 2; Sandy Lake, Mercer County, 2; Sugar Lake, Crawford County, 1; Somerset, 2). WEST VIRGINIA (Cranesville, 1; Cranberry Glades, Pocahontas County, 1).

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National Museum of Canada, Ottawa, December 15, 1947.

BREEDING BIRDS OF VIRGIN PALOUSE PRAIRIE

BY LEONARD WING

THE Palouse Prairie is perhaps the largest prairie type west of the Rocky Mountains. The term "Palouse" is generally used to designate the bunch-grass prairie of southeastern Washington and adjacent parts of Idaho and Oregon. However, identical vegetation occurs near by in southern British Columbia and western Montana. Thus, it is bounded by the timber country of the Blue Mountains on the south, the central Washington desert on the west, the timber area stretching from the Cascades to northern Idaho on the north, and the timbered outlines of the Bitterroots on the east.

In a more narrow sense, the term Palouse Country locally designates

the bunch-grass area lying north of the Snake River in eastern Washington and northern Idaho. Rolling hills, usually less than 100 feet high, dominate the area, but sometimes deeper canyons, such as that of the Snake River (two thousand and more feet deep) cut through the Palouse Country. The elevation ranges from a low of about 2500 feet on the breaks of the Snake River to 3000 to 4000 feet near the mountains. Farther west the country gradually drops in elevation to 700 feet where it merges into the sagebrush-grass type of desert.

The rainfall varies from an average of 14 inches on the western side (less in the desert) to perhaps 25 inches near the mountains on the eastern border. Pullman, 12 miles north by east of this study area, has an annual rainfall that varies from 13 to 30 inches, but averages about 20 inches. The winter rainfall that characterizes the climate carries through the dry summer, partly because the heavy soil is a loess of considerable thickness. Another characteristic of the climate influencing rainfall effectivity is the general cloudiness of winter, in marked contrast to the general clearness of summer.

The grassland type varies with slope and altitude. Daubenmire (An Ecological Study of the Vegetation of Southeastern Washington and Adjacent Idaho. Ecol. Monog., 12: 53–79, 1942) establishes three vegetation zones for the Palouse area. Representatives of two of these appear in my bird-census plot. The south-facing slopes, because of greater dryness, rather faithfully portray the Agropyron-Poa association characteristic of the drier (more western and lower) parts. Breeding birds make little use of the Agropyron-Poa type on the census area, and confine themselves to the Festuca-Agropyron type, which covers most of the area.

Of importance in the area are the many brushy spots found in the Festuca-Agropyron type. Because the area lies along a critical rainfall margin, the brush is by nature restricted to protected slopes. The principal brush species are *Symphorocarpos*, *Rosa*, and *Prunus*, with some *Amelanchier* and *Crataegus*.

Grazing seems to increase the amount of brush in the Palouse, for cattle and horses prefer the less-resistant herbaceous plants. Disturbance of the soil by ground squirrels also favors brush increase. Because moisture is a critical factor, boundary fences often markedly increase the amount and growth of brush by increasing deposition of snow. Plowing adjacent fields often throws furrows against the fencerows and increases the amount and growth of brush by deepening the top soil. Brush is noticeably more prevalent along the west boundary fence where snow drifts into the breeding-bird area rather than the north side where snow drifts into the adjacent plowed field.

It should not be understood that brush is only a recent characteristic of the Palouse Prairie; brush has always been abundant. There is hardly a square yard in the Festuca-Agropyron type that does not possess a stunted member of one of the brush species, generally but a few inches high.

The specific area used in this study of the breeding birds in the Virgin Palouse Prairie lies immediately back from the north breaks of the Snake River about 12 miles south-by-west of Pullman, Washington (Sec. 29, T. 38 N., R. 44 E. W. M.), at an altitude of about 2850 feet. I have not determined the relief, but it appears to be not more than 75 feet, which, though a little steeper of slope than the average, is within the average range of the Palouse Country. As determined by plane-table mapping, the area embraces 28.2 acres.

This census area has been preserved from plowing only because a sharp ridge cuts diagonally across the northwest corner of a ranch property. The sharpness of the slope has made it inconvenient to cross with the heavy farm equipment used in this country—even in the days of horse-drawn plows, harrows, headers, and combines. It was used for horse pasture, however, rather consistently until 1931, but has not been used by stock since, except as a few head have been permitted to roam at will over the entire ranch in the fall after the crop has been harvested.

Plowing of the sod in the adjoining land began in the late 1870's and was well underway by the 1880's. Old residents report a considerable increase in brush with the coming of horse-pasturing, and it may be that the area today has somewhat more brush than before the coming of the white man. Cattle grazed little even in the early days, for the land switched very rapidly from sod to wheat, the present major crop. Of late years dry peas have also been raised in considerable quantity.

The breeding pairs of birds counted on the area are listed on the basis of average number on a hundred acre basis, in order of abundance as follows (1942–1947). (For details of yearly data, see Audubon Field Notes.)

Brewer's sparrow (*Spizella breweri*)	46.8
Lazuli bunting (*Passerina amoena*)	24.1
Tolmie warbler (*Oporornis tolmiei*)	17.7
Song sparrow (*Melospiza melodia*)	9.2
Little flycatcher (*Empidonax traillii*)	9.2
Grasshopper sparrow (*Ammodramus savannarum*)	3.9
Marsh hawk (*Circus cyaneus*)	2.1
Western meadowlark (*Sturnella neglecta*)	2.1
Short-eared owl (*Asio flammeus*)	0.7
Chat (*Icteria virens*)	0.7
Vesper sparrow (*Pooecetes gramineus*)	.7
Pheasant (*Phasianus* sp.)	2.5

The commonest birds, Brewer's sparrow, lazuli bunting, Tolmie warbler, song sparrow, and little flycatcher, are associated with the brush patches. It is customary to associate the little flycatcher with stream-sides and damp meadows, but on this sample of Palouse vegetation, the little flycatcher lives on hillsides. Stream bottoms supporting low trees and shrubs are uncommon in the Palouse, but little flycatchers are also found in such places. Presumably the little flycatcher has always lived on the dry brush hillsides of the Palouse Prairie.

The grasshopper sparrow occupies the edge between the Agropyron-Poa type and the Festuca-Agropyron type. In this type the marsh hawk and short-eared owl nest, the former in brushy spots, the latter in the open herbaceous growth. The only breeding bird found in the Agropyron-Poa type was the vesper sparrow.

The year to year averages have been consistent, which indicates stability in the climax type of biota as represented by the Palouse Prairie:

Year	*Birds per Hundred Acres*
1942	248
1944	227
1945	258
1946	248
1947	248
Average	246

The Brewer's sparrow fluctuated from a high of 15 in 1946 to a low of 12 in 1945. The years 1942, 1944, and 1947 had 13 pairs each. Tolmie warbler fluctuated from four to six pairs while the lazuli bunting fluctuated from five to eight. The consistency in the total perhaps indicates that in a stabilized community, such as we seem to find in the Virgin Palouse Prairie, changes in abundance of one species are reflected by adjustment changes in other species, so that the combined total remains substantially the same from year to year.

Chats, it might be added, are regularly found in the brush along the Snake River some 2000 feet below and six miles from the census area. They were not found up on the plateau area studied until the summer of 1947, and then only in the Festuca-Agropyron type of brush.

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THE ANTILLEAN GREBE AT CENTRAL SOLEDAD, CUBA

BY ALFRED O. GROSS

THE Antillean, Saint Domingo or least grebe (*Colymbus dominicus dominicus* Linne) one of the smallest members of the Colymbidae, is a native species of the Greater Antilles and the Bahama Islands. Locally it is variously known as zaramagullon chico, tigua, plongeon, and zambullidor. This little grebe is common in Cuba, but its distribution is localized and its abundance is largely determined by the available number of ponds and lakes which contain adequate food and suitable conditions for its nesting requirements. Much of the island is limestone country with underground drainage; hence, there are comparatively few lakes and ponds that provide the highly specialized needs of this bird.

Colymbus dominicus is represented in continental United States by *C. d. brachypterus* Chapman (1899: 255–256), the so-called Mexican grebe, found in the lower Rio Grande of Texas and southward to Panama, and *C. d. bangsi* van Rossem and Hachisuka (1937: 323), the Bang's grebe found in southern California, Arizona (Phillips, 1947: 121) and northwestern Mexico (A. O. U. Committee, 1944: 442). An allied race *C. d. brachyrhynchus* Chapman occurs in tropical South America. Since these birds differ only subspecifically their life histories and behavior are probably similar in many respects to the Antillean grebe (*C. d. dominicus*) discussed in this paper.

An unusual opportunity was presented to observe the Antillean grebe at the Atkins Garden and Research Laboratory located at Central Soledad about 12 miles east of Cienfuegos, Cuba, during my visit there from December 20, 1947, to January 19, 1948. I am indebted to Dr. Arthur G. Kevorkian, Director of the Laboratory, who made the arrangements for my visit. I am especially grateful to Mr. Frank Walsingham, Superintendent of the Gardens who provided me with every facility for my work and comfort during my stay at Harvard House. Mr. Walsingham not only acquainted me with the interesting plants and trees of the garden collected from all parts of the world, but also had an active interest in the birds, especially the grebes which nest in the artificial ponds of the Botanical Garden. He is responsible for observations made prior to and after my visit to Soledad.

The grebes were found nesting in three of the ponds. A pair nesting in one of the smaller ponds located near the greenhouse was chosen for detailed study partly because of its accessibility, but primarily because Mr. Walsingham had carefully observed the activities of this

one pair of birds since the July preceding my arrival in December.

The Antillean grebes, according to Mr. Walsingham, first appeared in the pond about 1941 after it had been dredged and deepened. Photographs taken in 1936 show this pond completely choked with a very dense growth of water plants, chiefly *Nelumbo lutea*, and totally unsuited to the specialized needs of the grebes which require ponds with more or less open water. When I arrived on December 20, 1947, there was a typical floating nest containing four eggs of the grebe located among a small growth of rushes (*Juncus* sp.?) and within five feet of the northern shore of the pond. Around the rushes was a fringe of water grasses and *Nelumbo*, commonly known as the American lotus, which was again invading the area. The leaves of the lotus, which lay on the surface of the water at spaced intervals, ranged from six inches to more than a foot in diameter. Some of the newly formed leaves were held aloft on their stems well above the level of the water. On the banks and on a small island in the center of the pond there were numerous palms and bamboo creating a truly tropical setting for the home of this grebe. In addition to the Antillean grebes, the American egret, *Casmerodius albus egretta* (Gmelin), yellow-crowned night heron, *Nyctanassa v. violacea* (Linnaeus), little green heron, *Butorides v. virescens* (Linnaeus), little blue herons, *Florida c. caerulea* (Linnaeus), and many Florida gallinules, *Gallinula chloropus cachinnas* Bangs, shared the excellent fishing and other food provided by the pond. In May, 1948, a pair of jacanas, *Jacana spinosa violacea* (Cory), with their brood of four downy young were seen skipping over the lotus leaves. A pair of pied-billed grebes, *Podilymbus p. podiceps* (Linné), which appeared soon after my arrival proved to be the source of much trouble in the domestic affairs of the little grebes.

The nesting record of this pair of Antillean grebes, during almost a year, is of special interest since it reveals an extraordinary productivity and a rapid succession of the laying of different sets of eggs, each set laid soon after the previous brood had been hatched. Mr. Walsingham who observed this pair of birds frequently during his daily visits to the garden from July onward informed me that the female had laid five sets of eggs up to the time of my visit. Three broods of five each were reared from eggs laid in a nest built among a growth of water grass near the center of the pond. When this nest became unusable because of being water soaked and flooded, the second nest was built among the rushes where two more sets of four eggs each were laid and hatched. When I arrived on December 20 the fifth set of four eggs was being incubated and the four young (three weeks old) of the fourth brood were being fed and cared for by the adults. There

were ten immature birds of the second and third broods in a distant arm of the same pond. The members of the two broods could be readily distinguished by the relative progress of their juvenal plumages and especially by the color of the eyes. The color of the iris of downy young is an olive brown; as the bird grows older it becomes whitish and then goes through different shades of yellow to the orange-yellow of the adult iris. The striping of the back and head so marked in the downy young also disappears as they grow older. The two broods comprising the ten older young were allowed to shift for themselves, but nevertheless, the male took time off, from his active duties at the nest and with brood number four, to make them occasional visits and to deliver food to these older young. The five members of the first brood had left the pond prior to my visit, according to Mr. Walsingham. Young in well advanced juvenal plumage and completely independent were seen in one of the adjacent ponds of the garden without an adult attendant, but there was no way of determining whether they were the first brood of the pair under consideration.

On December 21 a blind of bamboo and covered with building paper and palm leaves was built close to the nest containing the four eggs of set number five, to facilitate observations and photography at close range. The overall diameter of the floating mass was 13 inches at the water level, and the nesting cavity occupied by the incubating bird was only six inches in diameter and three-fourths of an inch deep. The nest was made chiefly of stems and leaves of water plants mixed with some mud which always appeared soggy and damp. The entire floating mass was easily tipped or slightly moved with a stick but was held in the same relative position by the stalks of rushes. The depth of the water in the vicinity of the nest was two and one half to three feet. The eggs were a pale greenish white or buff in color and averaged 3.71 by 2.51 centimeters in size, somewhat larger than the average (3.39 by 2.34) given by Bent (1919: 37) for 49 eggs of the Mexican grebe.

When I approached the pond on the morning of December 22 the incubating bird hurriedly covered the eggs with vegetation picked from the edge of the nest, slid off, dove and came up about 20 feet away. None of the birds observed in Cuba were seen to fly when disturbed at their nests. Miller (1932: 9) noted that the Mexican grebes at Lake Olomega, El Salvador, Central America, readily took wing. This may be due to a difference in the nature of the nesting sites. It was not unusual at times when they were suddenly frightened, for the older juveniles to rise above the water by a rapid flapping of their wings; after a few yards they would strike the water and dive.

The rate of progress of these birds under water was surprisingly great and a horizontal progression of 75 to 100 feet was not unusual for these expert divers.

The adult on leaving the nest joined the mate which was with the four young of brood number four. As I went closer the adult which I took to be the male became very much excited and uttered sharp piercing calls *eep-eep-eep* or *yeep-yeep-yeep* followed by a prolonged rapidly-uttered, rattle-like call which may be crudely represented by *ye-ye-ye-ye-e-e-e-e-e-e-e-e-e-e-e*. As I neared the blind all the grebes dove in a wild splash on this signal of the male. A few minutes after I entered the blind their suspicions of danger had subsided and their activities continued in an apparently normal way. The young which were about three weeks old swam about leisurely, frequently spreading their wings and preening their feathers to assist in the unsheathing process. Sometimes they would lie completely on one side on the surface of the water to groom the growing feathers of their breasts. The male was seen to dive and then come up with a beak full of food which one youngster snatched; it raced away pursued by the three others until the coveted meal was gulped down. At other times all four picked at large masses of food which had been brought up and held firmly in the beak of the adult. After 15 minutes the two adults swam cautiously toward the nest to make a casual inspection. They soon returned to their young which were dozing in the sun among the lotus leaves. Several times the young as well as the adults were seen to capture insects including a number of dragonflies. No attempt was made to incubate the eggs during the four hours I was in the blind. It was a warm day and it was evident that incubation was being continued without the aid of the parent bird. The eggs, well covered by warm soggy vegetation, were in an excellent artificial incubator. However, on cooler days and always at night the eggs were incubated by either the male or the female, both taking their turns at this task. While one was incubating the eggs the other adult remained with the four young, supplementing the food acquired by their own efforts. Most of the food was dark in color, chiefly decayed vegetable matter, algae and mud mixed with worms, larvae and aquatic insects. At times the adults captured crayfish and other shrimp-like crustaceans which were present in considerable numbers in the pond. These were highly prized as food and at one time the adult came up with a wriggling crayfish about three inches long. All four young scampered over the surface of the water to get the delicacy. The crayfish was snatched from the parent's beak and then from the beaks of successive young until one youngster gulped it down

with much effort and writhing of its neck. Both male and female busied themselves with the task of diving for food which they either ate themselves or more often allowed the gluttonous young to snatch from their beaks. Two Florida gallinules which regularly fed along the shores and in the pond sometimes approached within a few feet of the grebes, but their presence did not cause the least bit of disturbance and excitement. Neither did the herons bother them in any way. Ani birds, *Crotophagi ani* Linné, lizard cuckoos, *Saurothera merlini* D'Orbigny, and a red-bellied woodpecker, *Centurus s. superciliaris* (Temminck), were frequent visitors to the palm trees and bamboo, but their curious and diverse calls made no impression on the grebes. The pond was full of turtles of various sizes. One of the large turtles with a carapace no less than 12 inches in length swam by with his head projected out of the water. He came within inches of one of the adult grebes, but apparently it was not noticed. Frequently I saw smaller turtles basking in the sun on top of floating lotus leaves. The grebes paid no attention to them even when they plunged into the near-by water with a splash.

During the early morning of December 22 I approached the pond and entered the blind quickly before the bewildered grebe had a chance to cover her eggs properly. In about ten minutes both adults came swimming toward the rushes frequently retreating but coming ever closer to the nest containing the partially covered eggs. Both birds uttered alarm calls. One of the birds, which I assumed was the male because of his size and general relations to the family, swam close, with his breast pushed snugly against the floating islet. Then with a vigorous back stroke of his lobate feet he mounted the nest which moved and teetered under the impact of his body. The bird "nervously" picked up material from the edge of the nest and placed piece after piece over the exposed eggs. After they were completely covered, the material was trampled down firmly; no one would suspect the presence of the four eggs. With this task performed the male slipped off the nest, joined his mate waiting near by in the rushes, and together they swam back to the four young. I had not been in the blind long before I heard the loud characteristic call of a pied-billed grebe. A pair of these birds had invaded the pond, when and how I do not know, but they were to play an important role in the life of the Antillean grebes, which thus far had progressed smoothly and peacefully. The calls of the pied-billed grebes greatly excited the little grebes. Apparently they were at once recognized as competitors and enemies. It doubled the responsibilities of the male who in addition to taking his turn at the nest and feeding the brood of growing young, must now definitely

defend his territory. For the first hour nothing was done other than the exchange of warning calls with the pied-bills. However, the male Antillean grebe exhibited considerable "nervousness," rapidly fluttering his wings against the sides of his body. The wing of one side alternated with the movements of the other wing. This curious performance was usually accompanied by prolonged, high-pitched calls which I interpreted as *yē-yē-yē-yē-yē- ē-ē-ē-ē-ē-ē-ē-ē-ē-ē-ē.* The pied-bills finally approached the fringe of vegetation, but when they were within 40 feet of the nest the male Antillean grebe left his family, dove and came up within two feet of the challenging birds. He dashed at his nearest antagonist, thrusting out his beak and furiously fluttering his wings; with much splashing of water he drove the pied-bill well beyond the bounds of his established territory. This territory was roughly a radius of 40 feet from the nest. The pied-billed grebes were never allowed to come into that area without a battle. The little male grebe defended this territory throughout the remainder of the nesting season.

When I entered the blind on the morning of December 27 there were only three eggs in the nest which had been left uncovered. The two adults were about 20 feet from the nest in a group with the four older young. At first I saw no sign of the newly hatched young but did note that the axillar feathers were uplifted and arched over the back of one of the adults, presumably the female. As the sun rose higher and it became warmer a little striped head appeared through the feathers and uttered faint, but highly pitched *peeps*. It was evidence that the first young of brood number five was successfully launched. Later the youngster stretched out its neck and held its wide open mouth along the side of the mother's neck as if soliciting food. As it emerged further it lost its balance and fell into the water. Immediately it swam to the rear of its parent and apparently with little effort hopped onto her back and completely disappeared in the downy bed beneath the uplifted contour feathers. An unusual disturbance among a group of herons on shore caused the male and four older young to go into a dive but the female and her downy cargo remained afloat.

The appearance of the downy young caused a change in the behavior of the male. He seemed "jittery and excitable and acted impulsively" on the least provocation. His attitude toward the pied-billed grebes was also more antagonistic, and his attacks were more vicious whenever the larger grebe came close to the area of the now sharply defined territory.

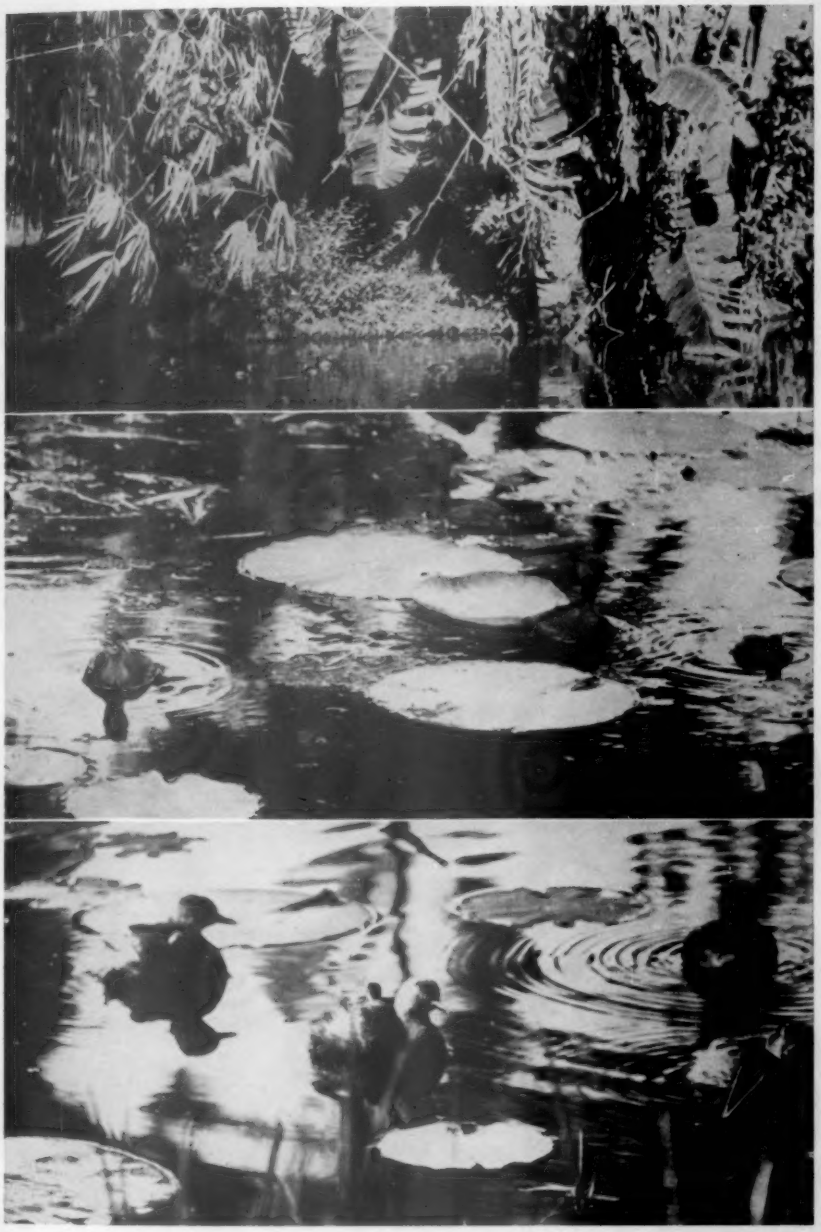
There still were three eggs in the nest when I left at noon, but one

was pipped. At 2 p. m. there were only two eggs, and each parent was carrying a downy young on its back. At 3 p. m. the male, still carrying one of the young, came to the nest and carefully covered the remaining two eggs. As he hurriedly left the nest the youngster tumbled into the water. The male, apparently startled by a noise inside the blind, swam on, leaving the youngster to climb back into the nest. This provided an excellent opportunity to see the striped markings of the head and the narrow longitudinal stripes and variegated mottlings of the back of the young. In the center of the crown was a reddish brown patch which stood out in marked contrast to the duller colors of the surrounding down. At first the little fellow seemed to be contented to be alone but later started a peeping which summoned both parents. As the male came alongside the nest he uttered a series of faint notes to which the youngster responded by jumping, sliding and finally tumbling into the water. As soon as he regained his poise he entered the feather thatched room on the back of his parent by the rear entrance as usual. The two adults each with its cargo of downy young joined the four older young about 25 feet from the nest. They then carried on their usual activities of feeding and preening with intervals of dozing. This was interrupted at 3:30 p. m. when the pied-billed grebe again attempted to invade the forbidden area. The male Antillean grebe was very much excited, uttered his battle cry, shook off the young he was carrying and scurried over the water toward the pied-bill who was routed and forced to retreat from that part of the pond. The youngster left swimming in the water went to the female to share the downy bed of his sibling.

The older young were fed frequently with crayfish, smaller crustaceans and miscellaneous vegetable matter, but up to this time no food was seen to be delivered to the newly hatched young. At 4:45 p. m. the female carrying the two young came to the nest to incubate the remaining two eggs. The young were not brooded in the nest but remained in the down beneath the arched feathers of her back. The male as well as the four older young spent the night in the rushes close to the nest.

By 9 a. m. December 28 the third egg had hatched, the shell was still in the nest, but the youngster was with the other two downy young on the back of the female. The egg shell was later removed from the nest by the male. The female was seen to dive with her cargo and, after coming up to the surface, all three heads popped out simultaneously from the feathers, as if seeking a breath of air after their plunge. The male was busily engaged in guarding his territory, but the four older young did not seem to be much concerned; they

ANTILLEAN GREBE: (*Top*) BLIND AT NEST NUMBER TWO CONTAINING THE FOUR EGGS OF SET NUMBER FIVE. DECEMBER 23, 1947. (*Middle*) MR. FRANK WALSINGHAM POINTING TO THE NESTING SITE IN THE RUSHES. DECEMBER 20, 1947. (*Bottom*) NEST NUMBER TWO AND FOUR EGGS OF SET NUMBER FIVE. DECEMBER 20, 1947.



ANTILLEAN GREBE: (*Top*) BROOD NUMBER TWO IN THE POND BENEATH THE BAMBOO AND OTHER TROPICAL PLANTS WELL AWAY FROM THE NEST SITE. DECEMBER 30, 1947. (*Middle*) ADULT MALE AND FEMALE BACK OF CENTER, ONE YOUNG OF BROOD FOUR AT LEFT, AND YOUNG OF BROOD FIVE, 17 DAYS OLD, AT RIGHT. JANUARY 13, 1948. (*Bottom*) MALE AND FEMALE, EACH WITH YOUNG OF BROOD FIVE ON BACKS. YOUNG TWO DAYS OF AGE. TWO YOUNG OF BROOD FOUR, AT RIGHT. DECEMBER 29, 1947.

carried on their games as usual, diving and chasing each other playfully and aimlessly about the lotus leaves.

At 8:20 a. m. on December 29 the fourth egg was still intact and was left uncovered in the nest. Both parents were with the older young, and the female carried the three downy youngsters of brood five. The male was seen to feed one of the downy young while it was off its mother's back and swimming in the water. This food was a small bit of vegetable matter which was taken from the bill of the adult by the young. No food was ever seen to be thrust into the open beak of the youngster as is done in the case of many other birds. After the downy young was fed it mounted a lotus leaf and remained in the warm sun for several minutes. Later when it uttered notes of distress the mother came alongside the giant leaf; the youngster hopped off into the water and immediately took his place on her back. Later the male was seen to deliver food to the young as they protruded their heads through the feathers of the back of the female. During the course of 30 minutes the male fed the young eight times. This seemed to be a common procedure during the first three or four days; after that they were fed while floating on the water. Between feedings one of the young was seen to emerge from the feathers at the side of the mother's neck and repeatedly pick at her eye. As this annoyance continued she elevated her head and the youngster in attempting to reach the eye in the raised position tumbled off into the water, but bobbed up like a puffball and quickly got aboard the mother. The young when hungry called incessantly, uttering a subdued *steep-steep* or *stee-stee* and sometimes more like *ye-ye-ye-yet*.

As soon as the sun struck the nest the male covered the single egg and rejoined his family. The instincts of these birds are strongly developed. It seems truly remarkable that, in spite of the blind and my frequent appearance, the remaining egg was not neglected after three young had hatched, one of them more than two days before. The fourth egg hatched during the late afternoon of December 29. According to Mr. Walsingham the eggs were laid over a period of about a week during the first part of December. The date of the start of incubation was not accurately noted and hence the period of incubation was not determined. The hatching of the four eggs completed a remarkable record of five successive broods comprising a total of twenty-three young from July, 1947, to January, 1948. Because of the protection afforded by the garden where all shooting is strictly prohibited and where the birds are never molested, all of the first four broods survived, but unfortunately this last brood was not so successful.

During the days that followed, the grebes were in the water away from the nest. Both adults at times carried the younger brood, but often all four were crowded onto the back of one parent, usually the female. For the first four nights the female or male spent the night on the nest with the four young on its back. The attitude of the adults to the brood of older young changed. When the latter appeared too near the downy young they were chased away by the male and sometimes by the female. Nevertheless when a large crustacean much too large to serve as food for the downy young was caught it was fed to the older ones. According to Mr. Walsingham, the older of any two broods of the season were chased to the farther end of the pond, but the procedure in this case seemed to be modified by the presence of the pied-billed grebes. By January 4 the clashes with the pied-billed grebes became more frequent and more intense. Why the pied-billed grebes were so persistent is not clear, unless they coveted the only good nesting site on the pond. They made desperate attempts to gain control, but it was being just as rigorously defended. The pied-bills even invaded the region of the nest, often emerging from their dives in the midst of the two broods of young which invariably initiated a wild scramble. One by one, three of the downy young disappeared. By January 7 only one of the four members of the fifth brood remained. I have no knowledge of their fate, but I am suspicious of the pied-billed grebes which in my absence may have attacked and killed these young during the numerous clashes.

The two adult Antillean grebes with their one remaining downy young moved to the other end of the U-shaped pond on January 8, leaving the four older young at the mercy of the pied-billed grebes. On January 9 and 10 the pied-billed grebes with no opposition from the adults closed in on the four older young of the Antillean grebes, which were now hiding in the rushes about the old nest. Again and again they were rushed, sometimes forcing them to leave the water and scramble up the steep shores of the pond. At other times they sought cover under the thick mass of palm leaves surrounding my blind. On January 11 three of this brood deserted the old homestead and joined their parents, but one of them was persistent and remained. The male Antillean grebe left his ousted families several times and fought off the larger grebes to aid the last young. Then he expended much effort in chasing this young bird from the old site which was now under the control of the pied-billed grebes. On January 13 and 14 all four young of brood number four and the remaining young of brood number five were with their parents in the other end of the pond. The pied-billed grebes had won the long struggle, but only temporarily.

After I left Soledad on January 20 Mr. Walsingham continued daily observations of the grebes. For about a week the pair of adult Antillean grebes with their several broods of young remained in the distant arm of the pond, leaving the pied-billed grebes in control of the area about the old nests. On January 27 the original pair of Antillean grebes was seen constructing a new nest in a place not more than a few feet from the old nesting site, in spite of the opposition offered by the pied-billed grebes. The Antillean grebe was seen sitting on the nest continuously from January 28 to 30 although there were no eggs. It seemed to be guarding the nest against the frequent raids of the larger grebes. The first egg was laid on January 31. There were two eggs on February first, three eggs on the second, and the set of four eggs was completed on February fourth. The bird incubated the eggs closely from the time the first egg was laid. All seemed to be going well with this sixth set of eggs until February 17, when the nest was deserted because of the constant onslaughts by the pied-billed grebes, which became more intense when the latter started to build a nest of their own only a few yards away. On February 18 the pied-billed grebe's nest contained one egg, on February 19, two eggs, and on February 23 the set of five eggs was completed.

Meanwhile, the Antillean grebes built another nest, their fourth since July, inside a wire netting which had been placed around a large Aroid growing in the water on the opposite side of the pond. Every time the grebes came to or left this nest they were obliged to dive beneath the submerged edge of the netting. On February 25 there was one egg, February 28 three eggs, and the set of four was completed on March 4. Unfortunately this seventh set of eggs in the fourth nest built by this pair of grebes disappeared. Presumably they were taken by turtles which seemed to be the only enemies in the pond which could reach the nest enclosed on all sides by wire netting.

For a time this seemed to be the end of the nesting activities of the Antillean grebes although the adults remained in the pond, feeding and serving as protectors of the various members of their large progeny. On the morning of April 30 Mr. Walsingham was amazed to see this pair of grebes with another brood of downy young. This nest, the fifth, was so well hidden by vegetation that it escaped his notice up to this time. On May 23 Mr. Walsingham wrote that the four young of this sixth brood were in excellent condition and growing rapidly. On May 14 he saw the adults completing a new nest among the lotus leaves near the center of the pond. On May 17 there were over two inches of rain which flooded the pond and submerged the nest. It was not determined whether or not it contained eggs. This was the sixth

and last nest built by this pair of Antillean grebes in the so-called Green House Pond. The little grebes finally deserted this pond, a few weeks later, to go to an adjacent, larger and more open pond better suited to their needs. However, the constant annoyance by the pied-billed grebes was evidently an important factor in causing them to leave the home pond. The pied-billed grebes succeeded in hatching their five eggs and rearing their young and were still present and in complete control of the pond during the middle of September, 1948, when the last report was received from Mr. Walsingham. The pied-billed grebes did not have the succession of many broods which was the dominant feature in the life history of the Antillean grebes.

In the course of a year the female Antillean grebe laid three sets of five and five sets of four eggs, a total of 35 eggs, of which 27 were hatched and two sets of four eggs each were deserted or destroyed. Twenty-four young were successfully reared. This presents a most extraordinary record of productivity. I know of no other case where this record has been achieved by any other wild bird in nature. The nesting of the Antillean grebe in the artificial pond of Atkins Garden was unexpectedly, perhaps abnormally, long and without the usual dormant or resting period we would expect. Mr. Walsingham assures me just one pair of grebes was concerned. This is made reasonably certain by the relation of the adults to the successive broods of young.

Similar conditions of great productivity may be found to be true of the allied races of *Colymbus dominicus* in continental America, when continuous observations have been made throughout the year. It is known that the Mexican grebe, *C. d. brachypterus*, has a long nesting period, and nests of this race have been found from March to December in different localities, but to my knowledge observations on a single pair of birds throughout the year have never been made.

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NOTES ON *HARPYHALIAETUS*

BY DEAN AMADON

Two little known eagles of the neotropics, the crested harpy and the solitary harpy, have been listed by Peters (Check-List Birds of World, 1: 245–246, 1931) and some other authors in separate genera as *Harpyhaliaetus coronatus* and *Urubitornis solitaria* respectively. Sharpe (Cat. Birds Brit. Mus., 1: 221, 1874) placed them both in the former genus and wrote, "At present I believe that there is only one species, but admit the possibility of two distinct kinds being differentiated, the grey bird (*H. coronatus*) having a more southern distribution than the black one (*H. solitarius*)." Gurney (Ibis: 490–493, 1876), a keen student of raptores, commented on this as follows, "I agree with Mr. Sharpe that both these birds may very properly be referred to the genus *Harpyhaliaetus;* but I cannot concur in his view that they should both be referred to the same species, as, although they agree in form and dimensions, they differ in *H. solitarius* being always (when adult) much more darkly coloured, with a shorter crest, and in their very distinct geographical distribution . . ." Although specimens are still too few to determine if their ranges overlap, in general the crested harpy occurs in southern South America north at least to southern Brazil, while the solitary harpy occurs from Perú, or possibly parts of Chile, north to Sonora, México.

In 1912, Kothe (Ornith. Monatsber., 20: 1–5) asserted that *solitarius* should be generically separated from *coronatus* because it lacks a crest, is darker in color, and has a more sharply hooked beak. Kothe figured the beaks of the two species but scarcely any difference is perceptible. Direct comparison of specimens also reveals no difference in the shape of the bill, a conclusion corroborated by others who were asked to make this comparison. Kirke-Swann (Monograph Birds Prey, 1: 447, 1930) also upheld *Urubitornis* on the basis of shorter crest and relatively shorter legs and tail. As the following measurements show, there seems to be no significant difference in the proportions of the two species. There is great variability in tail length, in part sexual and in part because the tail feathers of immatures are much longer than those of adults. This condition is not uncommon in hawks but is especially pronounced in these large species.

Of the alleged generic characters separating the two eagles, only the longer crest and lighter coloration of *coronatus*, in both adult and immature plumages, seem to be valid. The color pattern of both adult and immature plumages and all the important details of structure are the same. Although *solitarius* lacks a conspicuous crest, its occipital

feathers are pointed and slightly lengthened. The apparently complementary ranges of the two species, moreover, suggest that they may be geographical representatives of a former single species. Such closely related species are best placed in the same genus. In this case *Harpyhaliaetus* is the older of the two names.

Dr. Herbert Friedmann, who was kind enough to read these notes, suggested that the relationship of *Harpyhaliaetus* to *Buteogallus* be investigated. These two genera are undoubtedly related. *Buteogallus anthracinus* resembles *Harpyhaliaetus* in the pattern and color of both immature and adult plumages. The same is true of *Hypomorphnus urubitinga;* moreover, the coarse scutellation of the tarsi, as well as the complete absence of rufous on the wing in this species, suggests that it may be closer to *Harpyhaliaetus* than is *Buteogallus.* The type of the latter genus is *aequinoctialis,* a small, rufous species, in which the black coloration and wide white tail bar of the related species are absent or merely suggested. To me it does not seem desirable to place this rather small hawk in the same genus with the strikingly larger, more robust and different appearing *Harpyhaliaetus coronatus.*

Hypomorphnus urubitinga and the various species of *Buteogallus* usually live near water, often feeding largely upon reptiles, amphibians, or crabs. Little is known of the habits of *Harpyhaliaetus,* but, as noted below *H. solitarius* is apparently rapacious enough to attack fawns, while *H. coronatus* is said usually to smell of skunk, and evidently preys upon these mammals. Thus, while *Hypomorphnus* is in some respects intermediate between *Harpyhaliaetus* and *Buteogallus,* it seems closer to the latter in habits as well as in size and proportions. Further study of these and other related genera will show whether it is necessary to continue to separate *Hypomorphnus* from *Buteogallus.*

The genus *Harpyhaliaetus* may be diagnosed as follows: related to *Buteogallus* and *Hypomorphnus* but differing in the following respects: outer primaries much more sharply emarginated; tail to wing ratio smaller (about 0.46 as compared with about 0.60); occipital crest present or suggested; included species much larger, more robust and apparently more predacious in habits.

Van Rossem (Proc. Biol. Soc. Wash., 61: 67–68, 1948) recently described a race of the solitary harpy from Sonora, México, naming it *Urubitornis solitaria sheffleri.* Based on one pair of adults as compared with only one adult and one immature of the nominate race, the characters given are larger size and several minor differences of color. Examination of two adults of *solitarius* (Perú, Ecuador) reveals variation in most of the very points mentioned by van Rossem as distin-

guishing the northern bird, such as the basal marking of the primaries, the amount of white on the under-tail coverts, and the development of the partial white band at the base of the tail. Whether this is individual or age variation is not evident, but the color characters of *sheffleri* require confirmation. Further material (see below), also tends to reduce the supposed size difference between the two races, although *sheffleri* may prove to be sufficiently larger to warrant recognition.

Although van Rossem's specimens are the only ones thus far recorded from north of the Isthmus of Tehuantepec, the American Museum of Natural History has a male in immature plumage collected at "Los Masos" (5800 feet), Jalisco, México, on November 23, 1905, by M. Goodnight, then an assistant to J. H. Batty. Field notes on the label read, "Rather common on high mountains. A pair seen attacking two fawns but were driven away by mother and approaching hunter. Eye light yellow. Legs dirty greenish white." This specimen agrees in color with two immatures from northern South America. It is exceeded by one of them, also sexed as a male, in size.

Table 1 gives the measurements of three specimens of *coronatus* and five of *solitarius* in the American Museum of Natural History; to these have been added data for seven additional specimens of *solitarius* from Kothe and from van Rossem.

TABLE 1

Sex	*Locality*	*Wing length (chord in millimeters)*	*Tail length (central feathers in millimeters)*	*Tarsus (approximate length in millimeters)*
		Harpyhaliaetus coronatus		
		Adults		
Male	Matto Grosso, Brazil	517	245	134
?	Argentina	542	264	134
		Immature		
?	Argentina	556	305	124
		H. s. solitarius		
		Adults		
Male	Ecuador	510	230	128
Male*	Colombia	490	220	127
Female**	Colombia	525, 525	260, 250	135, 128
?	Perú	520	240	120
		Immatures		
Male	n. South America	535	295	122
Male?*	Guatemala	490	(225)	118
Female**	Colombia	520	270	135
?	Colombia	515	267	129
		H. sol. sheffleri		
		Adults		
Male*	southeastern Sonora	530	252	132
Female*	southeastern Sonora	552	260	131
		Immature		
Male	Jalisco	514	276	133

* From van Rossem (*loc. cit.*)
** From Kothe (*loc. cit.*)

SUMMARY

It is suggested that *Urubitornis* J. Verreaux be considered a synonym of *Harpyhaliaetus* Lafresnaye; the latter then will contain two species *coronatus* and *solitarius*. They appear to be closely related and to have complementary ranges, as far as known. The race *H. solitarius sheffleri* van Rossem from Sonora, México, requires confirmation. Another Mexican record for the species is given.

American Museum of Natural History, New York, N. Y., July 23, 1948.

BIOGRAPHICAL NOTES ON THE PENARD BROTHERS

BY FR. HAVERSCHMIDT

NEARLY forty years ago the first volume of a comprehensive work on the birds of the Guianas was published at Paramaribo in the Dutch language under the title 'De Vogels van Guyana' by Frederik Paul Penard and Arthur Philip Penard. Both authors have long since passed away and almost nothing is known about them in the ornithological world, so that it now seems a task of honor to devote a short note to their life and work.

The Penard family was of French origin and almost certainly descended from 'refugiés,' French Protestants who fled, owing to religious intolerance, from France to Holland, and who, in the 17th century, settled in Surinam. There they started a great many plantations, such as 'La Liberté,' 'Ma Retraite,' 'La Simplicité,' and several others still existing, although nearly all of them have now been deserted. Frederik Paul Penard, Senior, a merchant of ample means at Paramaribo, and his wife, Philippina Salomons, had four sons, three of whom were interested in natural history—the eldest, Frederik Paul, born January 26, 1876; the second, Thomas Edward, born May 7, 1878; the third, Arthur Philip, born April 6, 1880—all at Paramaribo.

The interest in natural history of Frederik and Arthur started in their early boyhood, but at the same time the first symptoms of a terrible disease were manifested, and both boys had to leave school early—Frederik at the age of nine, Arthur at eleven—and were obliged to spend the rest of their lives in seclusion.

The perseverance and moral power of both boys under these conditions are expressed in a letter from their mother dated November 5, 1909, after the death of her eldest son, Frederik: "Without any help and with untiring energy Frederik not only developed himself but also

taught his younger brother (Arthur) thus enabling him to educate himself and to become his coöperator in his later scientific work."

In 1896 they started the formation of a collection of bird skins and eggs from Surinam on which their future work was to be based. Owing to their physical disability they could never do any field work or collecting, themselves, but had to rely exclusively on the material which was brought to them by hunters, fishermen, Indians, and such people. In about thirteen years the whole collection of skins and eggs was brought together and was stored at their home at the Waterkant in Paramaribo, which is now the guest house of the 'Surinaamsche Bauxite Maatschappij' on the second floor of the building of the Alcoa Steamship Company, in which, also, their book was written. It was Arthur who negotiated with their helpers and who supervised the preparation of the specimens, making notes about them which had to be worked out by his elder brother, Frederik, who, in turn, wrote the entire text of the book. As a consequence the reader will notice that the whole work, even the preface, is written in the first person. Stress must be laid also on the great help and encouragement they received from their mother, Mrs. Penard-Salomons, for whom they had a great veneration and to whom the first volume was dedicated. She died at Paramaribo on December 24, 1926, at the age of 76.

During their work they came in contact with other ornithologists such as Philip Lutley Sclater who named several birds for them, and the well-known German oologist, Adolph Nehrkorn (Katalog der Eiersammlung, 2e Aufl.: 167, 1910). I could not find, however, that they ever were in contact with that great expert on neotropical birds, Count Hans von Berlepsch. In 1902 a small number of birds was donated to the British Museum and in the following year a greater number of eggs. They also presented some bird skins to the museum at Georgetown in Demerara, which may have been lost in the fire which destroyed that institution some years ago.

When the manuscript of their book was completed, they sold their entire collection of bird skins to Lord Rothschild at Tring, England, getting in touch there with Ernst Hartert. From the money obtained in this way, Volume I of their bird book was printed and published, appearing in April, 1908.

In a letter dated April 21, 1908, their mother who apparently did all the correspondence wrote to Dr. F. A. Jentink, at that time director of the State Natural History Museum at Leiden, Holland, presenting to him a copy of Volume I: "As to Volume II, this is beyond our powers." She then asked him whether the Leiden Museum would not be able to publish the second volume. In a further letter dated

September 7, 1908, she donated the egg collection to that institution as well as the manuscript of Volume II even though the museum might not be able to publish it. It is a great credit to Jentink that he succeeded in collecting funds in Holland for printing and publishing the second and last volume. In his endeavours he was assisted by J. Büttikofer, the famous explorer of Liberia, at that time director of the Zoo at Rotterdam, who assembled a sum in that city for the desired purpose.

In May, 1910, Volume II was issued. Unhappily the senior author, Frederik Paul, did not live to see the completion of his task, as he died at Paramaribo on September 4, 1909, at the age of 33. The bird collection on which their work was based consisted of about 875 skins which are now in the American Museum of Natural History at New York, while the egg collection of about 15,000 specimens was received at the Leiden Museum in October, 1908 (Jentink, 'Verslag omtrent's Rijks Museum van Natuurlijke Historie te Leiden, loopende over het tijdvak van 1 September 1908 tot 1 September 1909,' Leiden: 10, 1909).

There exists a manuscript on the mammals of Surinam by the same authors, part of which was published in a series of articles in one of the daily papers at Paramaribo.

In 1907–1908, at Paramaribo, they published another book in three volumes, also in the Dutch language, under the title, 'De menschetende aanbidders der Zonneslang' (The man-eating adorers of the Snake of the Sun), which gives the psychology, folklore and customs of the Carib Indians of Surinam, a subject in which they became deeply interested through their frequent contact with Indians.

After the publication of the bird book, Arthur did not lose his interest in ornithology, although he ceased publishing about it. It was at his instigation and through his intermediacy and help that a collection of about 2000 bird skins was brought together in the years 1912–1914 for his elder brother, Thomas Edward at Arlington, Massachusetts, certainly the most comprehensive collection ever made of the lowland avifauna of Surinam.

Thomas Edward, the second son in the Penard family, went as a boy of thirteen to the United States where he later became an engineer with the Edison Company at Arlington, Massachusetts. He had the same interests as his brothers, ornithology and the folklore, language, and habits of the Carib Indians. He became an ornithologist of scientific prominence and published several important papers. The most valuable concerning the avifauna of Surinam were: 'Notes on a collection of Surinam birds (in co-authorship with Outram Bangs)

(Bull. Mus. Comp. Zoöl., 62 (2): 26–93, 1918). It is the report on the collection made in Surinam in 1912–1914; also a useful, 'A historical sketch of the ornithology of Surinam' (De West Indische Gids, 6: 146–168, 1924), and a paper in co-authorship with his brother Arthur (Arthur's last ornithological contribution), 'Bird catching in Surinam' (De West Indische Gids, 7: 545–566, 1926).

In 1930 he sold his bird collection to the Museum of Comparative Zoölogy at Cambridge, Massachusetts, and died in that city on October 27, 1936. His extensive library was dispersed after his death. A short biography of Thomas Edward, with bibliography, was published in 'The Auk,' 54: 232–234, 1937, while a short note with his portrait taken on the occasion of his 30th Edison anniversary on February 7, 1931 (extracted from 'Edison Life,' March, 1931) appeared in De West Indische Gids, 13: 1–2, 1931–1932.

As to Arthur, all the rest of his life he was engaged in collecting a tremendous quantity of facts about the language and habits of the Carib Indians, publishing on these topics from time to time or sending material and notes to specialists. Though blind and an invalid in the latter part of his life which he spent in a country seat outside Paramaribo he never lost courage nor ceased working, dictating his notes to an assistant.

As to the scientific merits of 'De Vogels van Guyana,' it would be unfair after forty years have elapsed to criticize its value. We can only remark that it is somewhat lacking in detail as to the distribution of the birds in the regions concerned, that there is often no clear distinction between birds which breed locally and those which do not, and that several species are accepted without sufficient evidence. The breeding seasons are somewhat vaguely mentioned, and since the authors were unable to do any field work themselves they had to rely for the breeding habits solely on what was told by their helpers; in most cases these people were not always aware of the scientific bearing of their words and not always sufficiently critical. The same holds true for the value of their egg collection; the identification of the specimens is solely dependent upon these coöperators. In two recent papers (W. Ph. J. Hellebrekers, 'Revision of the Penard oological collection from Surinam,' Zool. Meded., 24: 240–275, 1942; Hellebrekers, 'Further notes on the Penard oological collection from Surinam,' *op. cit.*, 25: 93–100, 1945) measurements, weights, and descriptions of the eggs are given with a summary of the breeding seasons, but we can only hope that some day the entire collection will be studied critically by somebody who has knowledge about neotropical birds.

These remarks do not in the least minimize the value of the Penards' book, in which a tremendous lot of knowledge is assembled and made accessible for the first (and for Surinam still the only) time, especially when we bear in mind the youth of the authors when writing their book, their isolation without the help of a library for reference, and the lack of material for comparison.

Arthur died at Paramaribo on September 12, 1932, at the age of 52. He is buried next his eldest brother, Frederik, and his parents in the old Protestant cemetery at the Gravenstraat in Paramaribo, near the south entrance. Owing to a mistake the date of Arthur's death is wrongly given on his gravestone as September 13.

Certainly the Penard brothers must be reckoned, on account of their many-sided scientific work, among Surinam's greatest sons and 'De Vogels van Guyana' still is and always will be the foundation upon which all future ornithological work in Surinam will be based.

I am indebted for material for this note to Prof. C. H. de Goeje, The Hague, Netherlands; Dr. G. C. A. Junge, Leiden, Netherlands; James Lee Peters, Cambridge, Massachusetts, and William Penard, Paramaribo, Surinam.

Paramaribo, Surinam.

THE SIXTY-SIXTH STATED MEETING OF THE AMERICAN ORNITHOLOGISTS' UNION

BY OLIN SEWALL PETTINGILL, JR., SECRETARY

THE first meeting of the Union in the Missouri Valley and the fifth meeting west of Chicago was held in Omaha on October 11 to 15, 1948, at the invitation of The Nebraska Ornithologists' Union. Headquarters were at the Hotel Fontenelle where the business sessions and the Annual Dinner took place. Public sessions, an exhibition, special exhibits, and a reception were held in the Joslyn Memorial Art Museum.

BUSINESS SESSIONS

The business sessions were as follows: (1) First Session of the Council, Monday, October 11, 10:10 a. m. to 12:10 p. m. Number in attendance, 17. (2) Second Session of the Council, Monday, 1:35 to 4:05 p. m. Number in attendance, 17. (3) Meeting of the Fellows, First Session, Monday, 4:20 to 5:45 p. m. Number in attendance, 20. (4) Meeting of the Fellows and Members, Monday, 8:15 to 11:35 p. m. Number of Fellows present, 20; number of Members present, 21. (5) Third Session of the Council, Wednesday, 8:05 to 9:35 a. m. Number in attendance, 17. (6) Meeting of the Fellows, Second Session, Thursday, 8:10 to 9:35 a. m. Number in attendance, 20.

Reports of Officers. The Secretary reported that the total number of members of the Union, including both Honorary and Corresponding Fellows, is 2,040. This figure, when broken down into the various classes of membership, is as follows: Fellows, 51; Fellows Emeriti, 1; Honorary Fellows, 14; Corresponding Fellows, 61; Members, 141; Associates, 1,772. Three hundred and ninety persons have been proposed for associate membership. Their election will bring the total number of members to 2,430. Notices of the following deaths were received: Founder: Albert Kenrick Fisher. Fellow: Mrs. Florence Merriam Bailey. Corresponding Fellows: Walter Edward Collinge, Austin Roberts. Members: George Kruck Cherrie, Leon Jacob Cole, William Augustus Jefferies, Aldo Leopold, Francis Beach White. Associates: William Clark Adams, Courtney Brandreth, Grant MacDonald Cook, Reinhold Leo Fricke, Frederick Woods Haecker, Sadia Haskell, Arthur Hudson Helme, Robert Bruce Horsfall, Edwin Lincoln Moseley, Harry Arthur McGraw, Augustus Gibson Paine, Jr., George Parmly, William Pepper, Jr., Nels Theodore Peterson, John Livzey Ridway, Henri des Rivieres, John Bonner Semple, Golds-

borough Serpell, William Thomas Shaw, Harry Herbert Stone, Jr., John William Sugden, Henry Norton Torrey.

The Treasurer gave his report which is published in this number of 'The Auk.'

Dr. John T. Zimmer, Editor of 'The Auk,' gave a brief report in which he pointed out many of the current financial problems. According to the Intelligencer Printing Co., printers of the journal, an increased cost of about 20 per cent is anticipated in 1949. At the conclusion of the report, Dr. Zimmer submitted his resignation as Editor. The Council, in accepting his resignation, extended to him its deep appreciation for his seven years of service.

Report of Committees. Dr. R. Allyn Moser, Chairman of the Committee on Endowment, stated that 18 life memberships, two installments on life memberships, and 19 donations were obtained as a result of his committee's efforts, making a total addition of $2,006.00 to the General Endowment Fund.

The report of the Special Canadian Committee, given by Mr. Hoyes Lloyd, Chairman, showed total receipts since August 16, 1947, of $831.41 This sum was obtained from membership fees, bank interest, and donations. Total assets in Canada as of August 18, 1948, were $3,267.02.

During the year Dr. Leonard Wing, Chairman of the Committee for the Nomination of Associates, personally signed and sent out 2,360 letters soliciting associate memberships. At the time of the meeting he had received at least 209 acceptances.

Dr. Alexander Wetmore, Chairman of the Committee on Classification and Nomenclature of North American Birds, reported that the fifth edition of the Check-List is gradually nearing completion but will not be ready for publication in 1949. The ranges of species and subspecies are being entirely revised with the cooperation of the United States Fish and Wildlife Service. Material on ranges for the first half of the Check-List is already being summarized, mimeographed, and sent to collaborators for checking.

The Committee on Research is undertaking an active program. As outlined by Dr. Albert Wolfson, Chairman, it consists of four parts: (1) Organizing and publishing a book of recent research in ornithology with a view to stimulating additional research. (2) Building up a current file of research projects in the United States. (3) Providing editors of ornithological journals with a list of specialists for consultation. (4) Indexing unpublished doctoral theses.

The Committee on Education concerned itself with the selection of

candidates for student memberships, following the plan outlined in 1947. Dr. Frank A. Pitelka, Chairman, reported that letters sent to over 50 ornithologists inviting sponsorship of candidates resulted in the submittal of ten applications. All were favorably received and each candidate was informed of his grant. It is expected that 14 student memberships may be granted in 1949.

According to the Committee for the Relief of European Ornithologists, the task of getting food and clothing to European colleagues has been shared by several committees of American ornithological societies, including this committee. Packages have almost without exception been sent from individuals rather than in the name of an organization. Ornithologists who have received packages are located in Germany, Austria, Hungary, Poland, Finland, England, France, Greece, Czechoslovakia, Italy, Yugoslavia, Rumania, and Holland. The known total number of packages sent through the efforts of this committee and others is 2,309. Dr. and Mrs. John T. Emlen, Jr., who had charge of food, placed orders for 849 CARE packages. Dr. and Mrs. F. N. Hamerstrom, Jr., in charge of the clothing assignment, have records of at least 1,385 packages sent or assigned.

The Award of the Brewster Medal. The 1948 Brewster Medal was awarded, by action of the Council, to David Lack of Oxford, England, for his two publications, "Darwin's Finches" (Cambridge University Press, 1947) and "The Galapagos Finches (Geospizinae) A Study in Variation" (Occ. Papers Calif. Acad. Sci., No. 21, 1945).

Next Stated Meeting. Fellows and Members, meeting jointly, accepted the invitation of the Buffalo Ornithological Society and the Buffalo Society of Natural Sciences to hold the Sixty-seventh Stated Meeting in Buffalo on October 10 to 14, 1949. The President appointed James Savage, Chairman of the Local Committee on Arrangements.

Amendments of the By-Laws. Two proposed amendments of the By-Laws were adopted and referred to the Union for final approval in 1949. The first would remove the limit on the number of Members to be elected in any one year. At present no more than 15 Members may be elected. The second would make official a newly edited version of the By-Laws.

Miscellaneous Matters. Plans for the Tenth International Ornithological Congress are highly indefinite. There is some indication that a meeting might be held in Switzerland or Sweden in 1950.

Because an increased cost in the manufacture of 'The Auk' is anticipated in 1949, it is expected that the number of pages will be reduced, perhaps to about 500.

ELECTION OF OFFICERS

The officers elected for 1949 are as follows: *President*, Robert Cushman Murphy; *Vice-Presidents*, Josselyn Van Tyne and Alden H. Miller; *Secretary*, Olin Sewall Pettingill, Jr., *Treasurer and Business Manager*, R. Allyn Moser. *Members of the Council* (in addition to officers and ex-presidents): Austin L. Rand, A. J. van Rossem, John T. Zimmer, Frederick C. Lincoln (term to expire in 1950).

The Council elected Harvey I. Fisher, *Editor of 'The Auk'*; Julian K. Potter (Chairman), R. M. de Schauensee, and James Savage, *Investing Trustees*.

ELECTION OF FELLOWS, MEMBERS, AND ASSOCIATES

FELLOWS—5

Oliver Luther Austin, Jr., Tuckahoe, New York.
Thomas Dearborn Burleigh, Moscow, Idaho.
James Cowan Greenway, Jr., Cambridge, Massachusetts.
Roger Tory Peterson, Glen Echo, Maryland.
Frank Alois Pitelka, Berkeley, California.

CORRESPONDING FELLOW—1

Sálim Ali, Bandra, India.

MEMBERS—15

Maurice Broun, Kempton, Pennsylvania.
Allen Joseph Duvall, Washington, D. C.
Albert I. Good, Cameroun, West Africa.
Charles Overton Handley, Sr., Charleston, West Virginia.
George Elford Hudson, Pullman, Washington.
Joe T. Marshall, Jr., Berkeley, California.
Charles Ketcham Nichols, Ridgwood, New Jersey.
Max Minor Peet, Ann Arbor, Michigan.
William Henry Phelps, Jr., Caracas, Venezuela.
John McBriar Robertson, Buena Park, California.
James Osborne Stevenson, Washington, D. C.
Robert Winthrop Storer, Berkeley, California.
Arthur Stupka, Gatlinburg, Tennessee.
Wendell Taber, Cambridge, Massachusetts.
Ralph Emerson Yeatter, Urbana, Illinois.

ASSOCIATES—390

ATTENDANCE

Attendance at the meeting showed a total of 121 members, composed of 21 Fellows, 24 Members, and 76 Associates. Represented were 28

states, the District of Columbia, Alaska, and two provinces of Canada (Saskatchewan and Ontario). About 110 guests were present, bringing the total registration to approximately 241.

FELLOWS, MEMBERS AND ASSOCIATES PRESENT

PATRONS:—HOYES LLOYD, MRS. DAYTON STONER.

FELLOWS:—John W. Aldrich, Arthur A. Allen, A. M. Bailey, James P. Chapin, Herbert Friedmann, Lawrence E. Hicks, S. Charles Kendeigh, Frederick C. Lincoln, Jean M. Linsdale, Alden H. Miller, Robert T. Moore, Robert Cushman Murphy, Mrs. Margaret M. Nice, James L. Peters, Olin Sewall Pettingill, Jr., A. L. Rand, Herbert L. Stoddard, A. J. van Rossem, Josselyn Van Tyne, Alexander Wetmore, John T. Zimmer.

MEMBERS:—Dean Amadon, Mrs. A. Marguerite Baumgartner, William H. Behle, Maurice Brooks, Allen J. Duvall, John T. Emlen, Jr., Paul L. Errington, Donald S. Farner, Harvey I. Fisher, O. J. Gromme, Harry W. Hann, Joseph J. Hickey, Laurence M. Huey, Peter Paul Kellogg, Burt L. Monroe, R. Allyn Moser, Richard H. Pough, Charles H. Rogers, Alexander Sprunt, Jr., T. C. Stephens, Gustav A. Swanson, Lawrence H. Walkinshaw, Leonard Wing, Albert Wolfson.

ASSOCIATES:

Alaska, 1—Henry C. Kyllingstad, Mountain Village.

California, 1—Mrs. Junea W. Kelly, Alameda.

Colorado, 1—Virgil C. Rosenbaum, Denver.

Illinois, 5—Karl E. Bartel, Blue Island; William J. Beecher, Chicago; Paul E. Downing, Highland Park; Mrs. Tom Sorrill, Ursa; John Wannamaker, Elsah.

Iowa, 7—J. Harold Ennis, Mt. Vernon; Myrle L. Jones, Boone; Zell C. Lee, Sioux City; Jack W. Musgrove, Des Moines; Fred J. Pierce, Winthrop; Maynard Reece, Des Moines; Bruce F. Stiles, Des Moines.

Kansas, 5—Rollin H. Baker, Lawrence; L. B. Carson, Topeka; E. Raymond Hall, Lawrence; Charles G. Sibley, Lawrence; H. Wayne Trimm, Manhattan.

Maryland, 3—Seth H. Low, Laurel; Chandler S. Robbins, Laurel; Robert E. Stewart, Laurel.

Michigan, 1—Robert M. Mengel, Ann Arbor.

Minnesota, 4—Harvey L. Gunderson, St. Paul; Bryon E. Harrell, St. Paul; Forrest Lee, St. Paul; Dwain W. Warner, Minneapolis.

Missouri, 3—Robert H. Gensch, Kansas City; Oscar Hawksley, Warrensburg; Esther L. O'Connor, Kansas City.

Nebraska, 17—Mrs. A. M. Brooking, Hastings; David Damon, Lincoln; Mary E. Ellsworth, Omaha; William Ferguson, Omaha; Adrian C. Fox, Lincoln; L. O. Horsky, Omaha; Rodney K. Johnson, Friend; Mrs. Velista P. Leist, Omaha; Mrs. Jane M. Moser, Omaha; Nellie E. Orme, Omaha; Mrs. S. A. Perkins, Omaha; William F. Rapp, Jr., Crete; Sigsby S. Sears, Omaha; Mrs. Jane B. Swenk, Lincoln; Thomas B. Thorsen, Lincoln; Wilson Tout, North Platte; Joseph J. Unger, Omaha.

New Jersey, 1—Mrs. Herbert E. Carnes, Tenafly.

New York, 8—Mrs. Ruth T. Chapin, New York; Duane Featherstonaugh, Duanesburg; Lawrence I. Grinnell, Ithaca; Fred T. Hall, Rochester; Raymond J. Hock, Ithaca; Mrs. Grace E. Barstow Murphy, New York; Carl Tucker, Mt. Kisco; Mrs. Marcia B. Tucker, Mt. Kisco.

North Dakota, 1—R. T. Gammell, Kenmare.

Oklahoma, 1—F. M. Baumgartner, Stillwater.

Ontario, 3—W. Earl Godfrey, Ottawa; Mrs. Wilmot Lloyd, Ottawa; Margaret H. Mitchell, Streetville.

Oregon, 1—George C. Ruhle, Crater Lake.

Pennsylvania, 2—Frederick V. Hebard, Philadelphia; George B. Thorp, Pittsburgh.

Saskatchewan, 1—Dick Bird, Regina.

South Carolina, 1—E. B. Chamberlain, Charleston.

South Dakota, 1—Herman F. Chapman, Sioux Falls.

Tennessee, 1—Joseph C. Howell, Knoxville.

Texas, 2—Albert J. B. Kirn, Somerset; Mrs. Anne Hinshaw Wing, College Station.

Wisconsin, 4—James R. Beer, Madison; Warren Dettman, Milwaukee; Brina Kessel, Madison; Elizabeth A. Oehlenschlaeger, Milwaukee.

Wyoming, 1—A. B. Mickey, Laramie.

PUBLIC SESSIONS

Six public sessions were held in the Joslyn Memorial Art Museum. Four sessions were featured by the reading of papers. The session on Wednesday afternoon was devoted to a symposium, and the session on Thursday afternoon consisted mainly of a showing of motion pictures. An outline of the program is presented below. Titles marked with an asterisk (*) indicate lantern slide illustrations; those with two asterisks (**) indicate motion pictures.

TUESDAY MORNING SESSION

Welcome by MR. GLEN CUNNINGHAM, Mayor of Omaha.

Welcome by MR. EUGENE KINGMAN, Director of The Joslyn Memorial Art Museum.

Response on behalf of The American Ornithologists' Union.

Roll call of Fellows and Members, Report of the Business Meetings, Announcements of the Result of Elections and the Brewster Memorial Award.

Announcements from the Local Committee on Arrangements.

The Mysterious Lyre-tailed Honey-Guide. JAMES P. CHAPIN, American Museum of Natural History, New York City.

Fledgling Feeding by Parasitic Cuckoos. HERBERT FRIEDMANN, United States National Museum, Washington, D. C.

Seasonal Changes in Coloration in Adult California Gulls. CHARLES H. ROGERS, Princeton Museum of Zoology, Princeton, New Jersey.

*Notes on the Penguin of the Snares Island, New Zealand. ROBERT CUSHMAN MURPHY, American Museum of Natural History, New York City.

TUESDAY AFTERNOON SESSION

A Plea for the Pencil. MARGARET M. NICE, Chicago, Illinois.

*The American Assemblage of Passerine Birds. W. J. BEECHER, Chicago Natural History Museum.

*The Song of the Gambel's Sparrow. ANNE H. WING, College Station, Texas.

Survival in Birds Banded at the Hastings Reservation. JEAN M. LINSDALE, Hastings Natural History Reservation, Monterey, California.

*Banding Data and Population Indices. JOSEPH J. HICKEY, University of Wisconsin, Madison.

The Bird-Banding Program of the Fish and Wildlife Service. SETH H. LOW, U. S. Fish and Wildlife Service, Laurel, Maryland.

The Distribution and Migration Program of the Fish and Wildlife Service. CHANDLER S. ROBBINS, U. S. Fish and Wildlife Service, Laurel, Maryland.

WEDNESDAY MORNING SESSION

Concepts of Hybridization and Intergradation in Wild Populations of Birds. ALDEN H. MILLER, Museum of Vertebrate Zoology, University of California, Berkeley.

*The Seventy-five Percent Rule for Subspecies. DEAN AMADON, American Museum of Natural History, New York City.

*Character Gradients in the Yellowthroats (*Geothlypis*) of Western North America. WILLIAM H. BEHLE, University of Utah, Salt Lake City.

*Convergence in the American Orioles. W. J. BEECHER, Chicago Natural History Museum.

*Species Formation in the Mexican Red-Eyed Towhees, Avian Genus *Pipilo*. CHARLES G. SIBLEY, Museum of Natural History, University of Kansas, Lawrence.

**Raising a Sandhill Crane. LAWRENCE H. WALKINSHAW, Battle Creek, Michigan.

*The Nesting of the Dipper in the Gothic Region of Colorado. HARRY W. HANN, University of Michigan, Ann Arbor.

*Routes of Migration of Shore Birds in the Pacific Coast Area. ROLLIN H. BAKER, Museum of Natural History, University of Kansas, Lawrence.

*Territorial Behavior in the Red-winged Blackbird. JAMES R. BEER, University of Wisconsin, Madison.

WEDNESDAY AFTERNOON SESSION

SYMPOSIUM

Recent Studies on the Problems of Bird Migration

ALBERT WOLFSON, Presider

The Annual Stimulus for Migration. DONALD S. FARNER, The State College of Washington, Pullman.

Energy Resources and Migration. S. CHARLES KENDEIGH, University of Illinois, Champaign.

Experiments in Bird Navigation. RAYMOND J. HOCK, Cornell University, Ithaca, New York.

The Origin and Evolution of Migration. ALBERT WOLFSON, Northwestern University, Evanston, Illinois.

THURSDAY MORNING SESSION

Another Specimen of the Cincinnati Warbler. GEORGE MIKSCH SUTTON, Museum of Zoology, University of Michigan, Ann Arbor.

*Bird Populations and Farm Ponds in North Central Oklahoma. F. M. BAUMGARTNER, Oklahoma Agricultural and Mechanical College, Stillwater.

*The Relative Abundance of the Birds of Knox County, Tennessee, as Determined Through a Roadside Census. JOSEPH C. HOWELL, The University of Tennessee, Knoxville.

The Forthcoming Pacific Science Congress. GRACE E. BARSTOW MURPHY, Crystal Brook, New York.

*The Bermuda Cahow Still Lives. FRED T. HALL, Rochester, New York.

*Patterns of Shifting Ranges among Some Birds in Minnesota. DWAIN WILLARD WARNER, Minnesota Museum of Natural History, University of Minnesota, Minneapolis.

An Ornithological Reconnaissance of the Eastern Canadian Arctic. ALLEN J. DUVALL, U. S. Fish and Wildlife Service, Laurel, Maryland.

*Ecological Distribution of Birds in the Teslin Area, Yukon Territory. LEONARD WING, Agricultural and Mechanical College of Texas, College Station.

THURSDAY AFTERNOON SESSION

*The Trumpeter Swans of the Grand Prairie Area of Northern Alberta. DUANE FEATHERSTONAUGH, Duanesburg, New York.

**Birds of the Coasts and Llanos of Colombia. LAWRENCE I. GRINNELL, Ithaca, New York.

**Nuptial Performances of the Western Grebe. DICK BIRD, Regina, Saskatchewan.

*The Bristle-thighed Curlew and Other Birds of the Alaskan Tundra. ARTHUR A. ALLEN, Cornell University, Ithaca, New York.

**Birds of the Alaskan Tundra. HENRY C. KYLLINGSTAD, Mountain Village, Alaska.

**Birds of the Colorado High Country. ALFRED M. BAILEY, Denver Museum of Natural History.

EXHIBITION AND SPECIAL EXHIBITS

The Second Omaha Biennial Invitational Exhibition of Contemporary Bird Drawings and Paintings was held in the Joslyn Memorial Art Museum in connection with the meeting. There were over one hundred pen and ink drawings, watercolors, and oils, representing the work of 46 bird artists in the United States and Canada.

Also held in the Joslyn Memorial Art Museum in connection with the meeting were two special exhibits, one by the United States Fish and Wildlife Service showing banding traps and materials, and another by Mr. Fred J. Pierce of Winthrop, Iowa, displaying a fine collection of books, rare and current.

SOCIAL EVENTS

A complimentary dinner for the Fellows was given by the Local Committee on Monday evening at the Hotel Fontenelle.

Over five hundred persons attended the informal reception given Tuesday evening at the Joslyn Memorial Art Museum by the Board of Trustees of the Museum and The Nebraska Ornithologists' Union in honor of The American Ornithologists' Union and guests. This occasion marked the official opening of the bird artists' exhibition.

On Wednesday evening 165 members and their guests enjoyed the Annual Dinner in the Ball Room of the Hotel Fontenelle. Entertainment was furnished by the Union Pacific Quartet and a group of Indians, dressed in native costume, from the Omaha Tribe. 'The Auklet' which is "an occasional journal for ornithologists" made its appearance with 44 pages, and several illustrations drawn by Milton Myers.

With Alexander Sprunt, Jr., as Master of Ceremonies, about 75 members and guests gathered on Thursday evening in the Embassy Room of the Hotel Fontenelle for informal entertainment. There were talks on a variety of subjects and a showing of excellent motion pictures by William Ferguson.

FIELD EXCURSION

Starting at 8:00 a. m. on Friday, 32 members and guests took a trip by bus to Fontenelle Forest which is the largest unbroken native forest in Nebraska. Due to the season, very few birds were observed. The party returned for a luncheon at the Livestock Exchange in Omaha. Several members, instead of making the field excursion, visited the Nebraska State Museum at Lincoln.

RESOLUTIONS

At the public session on Thursday morning, the Resolutions Committee consisting of Dr. James P. Chapin, Mr. James L. Peters, and Dr. Josselyn Van Tyne gave the following report:

Whereas, The American Ornithologists' Union is about to conclude its Sixty-sixth Annual Meeting in the City of Omaha, be it

Resolved, that we express the deep gratitude of the Union to The Nebraska Ornithologists' Union, the Omaha Audubon Society, and the Fontenelle Forest Association for their warm support of our meeting and for the kind hospitality they have extended to us; and be it

Resolved, that we extend our sincere thanks to the Trustees of the Joslyn Memorial Art Museum, and its Director, Mr. Eugene Kingman, for providing such an excellent meeting place; and be it

Resolved, that we voice our appreciation to Dr. R. Allyn Moser, Chairman of the Local Committee on Arrangements, and all the members of his Committee, to wit, Mrs. Jane M. Moser, Mrs. Mary L. Perkins, Mrs. Jane B. Swenk, Mrs. Bertha C. Minardi, and Messrs. Charles C. Ayers, David Damon, William Ferguson, Adrian C. Fox, Harold Gifford, Earl W. Glandon, Sigsby S. Sears, and Bruce F. Stiles for their excellent work in planning and carrying through so successfully all the arrangements for the first Omaha meeting of The American Ornithologists' Union.

THE AMERICAN ORNITHOLOGISTS' UNION

REPORT OF THE TREASURER, FISCAL YEAR ENDING SEPTEMBER 15, 1948

RECEIPTS

Balance from 1947		$2,049.05
Dues:		
Fellows	$150.00	
Members	426.00	
Associates	5,728.43	
Life (all classes)	1,370.26	
		7,674.69
Subscriptions to The Auk		1,002.40
Sales of Publications (back Auks, supplements, etc.)		434.40
From authors for reprints		407.99
Sale of Auk Indexes		74.00
Sale of Abridged Check-Lists		32.75
Contributions (general)		748.00
Contributions to Endowment Fund		659.00
Special funds:		
General Endowment	$1,017.09	
Educational	27.25	
Brewster Memorial	428.73	
Ruthven Deane	275.35	
Bird Protection	56.54	
		1,804.96
Total to be accounted for		$14,887.24
Funds in Bank of Montreal, Ottawa, Ontario, as per statement of August 18, 1948		1752.77
Special Fund for Publication of Fifth Edition of the Check-List of North American Birds (on deposit in American Security and Trust Co., Washington, D. C.)		500.00

DISBURSEMENTS

Manufacture of The Auk:		
October 1947	$1,984.40	
January 1948	1,992.48	
April 1948	2,186.51	
July 1948	2,542.28	
Editor's Honorarium	600.00	
Mailing and wrappers (includes mailing of back numbers, corrections to mailing list, stencils, etc.)	981.00 (1)	
		10,286.67

Reprints (repaid in part by authors)		$632.37
Purchase of back numbers of The Auk		48.50
Refunds (overpayment of dues and orders that could not be filled)		48.07
Contributions:		
Zoological Society of London	$25.00	
International Committee on Zoological Nomenclature	10.00	
		35.00
Brewster Medal to Francis H. Kortright		18.20 (2)
Transfer to Girard Trust Co. of Philadephia to account of Investing Trustees		1,548.00 (3)
Service charges by bank		17.55
Administrative Expenses:		
Office of the Secretary (clerical help, postage, processing, stationery, etc.)		648.35 (4)
Office of the Treasurer and Business Manager (honorarium to the Asst. to the Treasurer, postage, expressage, stationery, printing and mailing of bills, etc.)		684.92
European Relief Committee		49.12
Membership Committee		95.30
Endowment Committee		89.67
Total expenditures		$14,201.72
Balance on hand		685.52
		$14,887.24

FREDERICK C. LINCOLN, *Treasurer and Business Manager.*

OFFICERS, COUNCIL, TRUSTEES AND COMMITTEES OF THE AMERICAN ORNITHOLOGISTS' UNION, 1949

	Expiration of Term
ROBERT CUSHMAN MURPHY, *President*	1949
JOSSELYN VAN TYNE, *First Vice-President*	1949
ALDEN H. MILLER, *Second Vice-President*	1949
OLIN SEWALL PETTINGILL, JR., *Secretary*	1949
R. ALLYN MOSER, *Treasurer and Business Manager*	1949
HARVEY I. FISHER, *Editor of 'The Auk'*	1949
MEMBERS OF THE COUNCIL IN ADDITION TO OFFICERS	
S. CHARLES KENDEIGH	1949
GEORGE H. LOWERY, JR.	1949
FRANK A. PITELKA	1949
JOHN T. EMLEN, JR.	1950
FREDERICK C. LINCOLN	1950
HERBERT L. STODDARD	1950

	Expiration of Term
Austin L. Rand	1951
A. J. van Rossem	1951
John T. Zimmer	1951
Jean M. Linsdale, *Cooper Ornithological Club Representative*	1949
Burt L. Monroe, *Wilson Ornithological Club Representative*	1949
Charles F. Batchelder, 1905–08	*Ex-Presidents*
A. C. Bent, 1935–37	
James P. Chapin, 1940–42	
Herbert Friedmann, 1938–39	
Hoyes Lloyd, 1946–48	
James L. Peters, 1943–45	
Alexander Wetmore, 1926–29	

Investing Trustees

Julian K. Potter, *Chairman*	1949
R. M. de Schauensee	1949
James Savage	1949

Committees

Committee on Finance. R. Allyn Moser, *Chairman*. Burt L. Monroe, Robert Cushman Murphy, Olin Sewall Pettingill, Jr., A. J. van Rossem.

Committee on Endowment. Herbert L. Stoddard, *Chairman*. Herbert W. Brandt, H. B. Conover, Stephen S. Gregory, F. H. Kortright, R. Allyn Moser, Mrs. W. W. Naumburg, James Savage, A. J. van Rossem.

Special Canadian Committee. Hoyes Lloyd, *Chairman*. J. A. Munro, L. L. Snyder.

Committee on Publications. The Editor of 'The Auk,' *Chairman*. The President, the Secretary, the Treasurer and Business Manager, the Editor of 'The Ten Year Index to The Auk' (Charles K. Nichols).

Committee on Communications. Olin Sewall Pettingill, Jr., *Chairman*. John T. Emlen, Jr., Albert Wolfson.

Committee on the Brewster Memorial Award. Austin L. Rand, *Chairman*. Harvey I. Fisher, Mrs. Margaret M. Nice.

Committee on Biography and Bibliography. T. S. Palmer, *Chairman*. A. W. Schorger, *Vice-Chairman*. Mrs. Elsa G. Allen, J. L. Baillie, Jr., Donald S. Farner, J. J. Hickey, Hildegarde Howard.

Committee on the Nomination of Fellows and Members. Harrison F. Lewis, *Chairman*. John W. Aldrich, Alden H. Miller.

Committee on the Nomination of Associates ("Membership Committee"). Leonard Wing, *Chairman*. William H. Behle, Emmet R. Blake, Maurice Brooks, John T. Emlen, Jr., George H. Lowery, Jr., C. Russell Mason, Burt L. Monroe, Eugene P. Odum, Robert T. Orr, Chandler S. Robbins, L. L. Snyder, L. McI. Terrill, Alexander Sprunt, Jr., Lawrence H. Walkinshaw.

Committee on Classification and Nomenclature of North American Birds. Alexander Wetmore, *Chairman*. Herbert Friedmann, *Vice-Chairman*. Frederick C. Lincoln, Alden H. Miller, James L. Peters, A. J. van Rossem, Josselyn Van Tyne, John T. Zimmer.

COMMITTEE ON BIRD PROTECTION. Ira N. Gabrielson, ***Chairman.*** **Robert P. Allen, Ian McT. Cowan, Philip A. DuMont, Richard H. Pough, Gustav Swanson.**

COMMITTEE ON RESEARCH. Albert Wolfson, ***Chairman.*** **D. S. Farner, Herbert Friedmann, S. Charles Kendeigh, Ernst Mayr, Alden H. Miller, Mrs. Margaret M. Nice, Josselyn Van Tyne.**

COMMITTEE ON EDUCATION. Frank A. Pitelka, ***Chairman.*** **William H. Behle, John T. Emlen, Jr., Eugene P. Odum, L. L. Snyder.**

LOCAL COMMITTEE ON ARRANGEMENTS FOR THE SIXTY-SEVENTH STATED MEETING. James Savage, *Chairman.* Harold H. Axtell, Clark S. Beardslee, Mrs. Herbert A. Hickman, Ward Klepfer, Harold D. Mitchell, Bernard Nathan, Mildred Baker Rosa, Edward L. Seeber, Mrs. James A. Selby, Albert R. Shadle, Alice S. Ulrich, Edward C. Ulrich, William C. Vaughan, Gertrude G. Webster, Albert J. Wright, II.

GENERAL NOTES

Feather replacement in the macaroni penguin, *Eudyptes chrysolophus* (Brandt).[1]—A number of years ago Lowe (Proc. Zool. Soc. London, 1933: 498–502) described the highly peculiar condition attendant upon molt in the jackass penguin, *Spheniscus magellanicus*. His dissection of one of these birds revealed a closely packed mass of nearly fully grown new feathers lying in the subcutaneous tissues, enclosed in long, slightly flattened, narrow cylinders, inclined at a distinct angle to both the under surface of the cutis and the bases of the old feathers. The extent to which these new feathers had developed subcutaneously accounted for their length and for the fact that when Lowe slit one of the follicular sheaths, the enclosed feather was found to be fully-formed, with characteristic terminal and lateral fraying into barbs and barbules. He writes that the usual involution of the Malpighian layer and of the stratum corneum of the epidermis is carried to a high degree of specialization in the jackass penguin, so that the crypt is long enough (20 mm.) and its walls thick enough to contain an almost fully-grown feather. "In addition, the follicular sheath assumes in the subcutaneous tissues such a separate or discrete existence as to place it almost on the level of a distinct organ . . . The crypts or follicles are packed close together, . . . separated by loose fat-laden areolar tissue, blood vessels, and nerves. The outside of each follicle has a highly polished, smooth, and corneous appearance, its base rests on the fascia covering the muscles, and its mouth opens in the usual way on the superficial surface of the epidermis and is in continuity with the epitrichial layer of the epidermis . . ."

At the time of his observations, Lowe seems to have assumed this condition to be unique in birds and he hardly dared even to ask if it might be characteristic of the penguins as a group and not merely of a single species in the group. However, there was earlier evidence, which must have been known to Lowe (as the papers in which the facts are recorded are listed by him) indicating that a similar state of affairs prevailed in the king penguin, *Aptenodytes patagonica*, and apparently also in Humboldt's penguin, *Spheniscus humboldti*. Seth-Smith (Proc. Zool. Soc. London, 1912: 60–62) found that in the king penguin the new plumage, " . . . was apparently fully grown before the old feathers were shed, this giving rise to the very puffed out appearance of the bird just before the actual feather shedding commenced . . . " He figures several feathers which show that the sheath of the new feather is attached to the end of the shaft of the old one. Bartlett (Proc. Zool. Soc. London, 1879: 6–9) noted that in Humboldt's penguin, " . . . the old feathers were pushed off by the new ones . . . the bird was entirely covered with its new plumage before the old feathers dropped off . . . "

Recently, evidence has come to light that shows that still another species (and genus) of the family exhibits this unusual mode of feather replacement, which is probably found in penguins generally. Lowe and others, have intimated that this is hinted at by the peculiar shedding of blocks of feathers *en masse* in many of the species.

Two specimens of the macaroni penguin, *Eudyptes chrysolophus*, were received in the flesh at the United States National Museum, and were skinned by Mrs. Roxie C. Simpson, taxidermist of the United States Fish and Wildlife Service. Unfortunately, she did not show them to me at the time but later told me that she was amazed to

[1] Published by permission of the Secretary of the Smithsonian Institution.

find that they had, as she put it, "almost as many feathers on the inside of the skin as on the outside." What she saw undoubtedly was the mass of new feathers which were freed from their sheaths as a result of her scraping away the fatty areolar subcutaneous tissue and had expanded their otherwise curled up webs. Fortunately, Mrs. Simpson saved some of the feathers that were lost in the process of skinning, and these I have examined with a magnifying glass. Attached to their bases in most cases are new feathers from five to 12 millimeters long and tightly curled up in their follicular sheaths. On slitting some of these open it was easy to see the nearly formed, typical, feathery structure within.

It follows from this that in at least three genera of penguins (*Spheniscus*, *Aptenodytes*, and *Eudyptes*) the new feathers are well developed before the old ones are shed, and that the new ones actually push out their predecessors, whereas in practically all other birds the new feathers supposedly begin to develop when the old ones are dropped. According to Stresemann (Handbuch der Zoologie, VII, Vögel, 1927: 32) the new feathers develop prior to the shedding of the old ones not only in penguins but also in cassowaries; they are not known to do so in any other group of birds.—HERBERT FRIEDMANN, *United States National Museum, Washington, D. C.*

Extension of range of the ringed penguin.—While I was a member of the U. S. Navy Second Antarctic Development Project, 1947–1948, it was my privilege to participate in a landing upon Peter I Island, Antarctica, located at 68° 50′ S., 90° 30′ W. We landed from the U. S. S. Edisto on February 15, 1948. Peter I Island is about fourteen miles long in a north–south direction and about five miles wide. It was entirely covered with snow except for the bare rock slopes. Lars Christensen Peak, a lofty rounded peak of an extinct crater about 3,937 feet high, is the greatest elevation. Our landing was made at Framnes Head, at the head of Sandefjord Bay. It is a steep, rugged platform of lava and basaltic rock about 250 feet long and 130 feet broad upon which a provision depot was established by Norway five days before our arrival. Near the cache of gear left by the Norwegians was a small rookery of Adelie penguins (*Pygoscelis adelie*). The Adelie has been recorded for Peter I Island and is more or less abundant in its immediate vicinity, but mixed with *Pygoscelis adelie* were two ringed penguins (*Pygoscelis antarctica*), which I collected as live specimens for The National Zoological Park. These two specimens did not appear to have been breeding, as were the Adelies which were in the last phase of the breeding cycle.

A search of the literature reveals that Peter I Island is a new locality for the ringed penguin (*Pygoscelis antarctica*). Murphy (Oceanic Birds of South America, 1: 407, 1936) states that the species does not range beyond the islands off the west coast of the Antarctic Archipelago and that it is resident on practically all islands of the American quadrant, from latitudes close to the Antarctic circle northward to the Falklands. The South Orkneys and the South Sandwich groups are its principal centers of abundance. South Georgia has never been more than a foothold for the species, and from the Falkland Islands it is recorded only as a straggler. *Pygoscelis antarctica* is not known to the continental coasts of South America.

Therefore, I report Peter I Island as a new range for *Pygoscelis antarctica*.

In captivity the ringed penguin is obstinate, stubborn, unintelligent, pugnacious, disagreeable, and above all a poor feeder, thus making the bird a poor zoo specimen. Its relatives will take food after a forced-feed period of about 30 days, but *antarctica* seemingly does not adjust itself to life in captivity. The result is that the bird has been displayed only twice, for the long trip from the south polar regions has proven

too much of an ordeal.—MALCOLM DAVIS, *The National Zoological Park, Washington, D. C.*

Wilson's petrel in interior Florida.—On June 10, 1948, while investigating the birdlife of Biven's Arm, a lake south of Paine's Prairie south of Gainesville, Florida, I noted a small, dark bird resting on the water about 75 yards distant. A few moments later, a low flying plane flushed the bird which was then obviously a Wilson's petrel (*Oceanites oceanicus oceanicus*). The white rump, characteristic legs and feet, were plainly visible. With me, at the time, were James Pittman and Marshall Nehrenberg, of Orlando, Florida.

The next morning an attempt was made by Dr. Pierce Brodkorb, of the biology department of the University of Florida, to secure the bird, but it was not found. The weather for this period, and both before and afterward, was quite normal.

Search of the literature fails to reveal any other inland Florida record. Biven's Arm is practically in the center of north Florida. A few days later, several of these petrels were observed en route from Key West to the Dry Tortugas, where I have seen them every June for the past four seasons.—ALEXANDER SPRUNT, 4TH, *The Crescent, Charleston 50, South Carolina.*

Death of a brown pelican (*Pelecanus occidentalis*).—On November 5, 1945, at about 7:30 a. m. on the northwest shore of Pensacola Bay just opposite its entrance into the Gulf of Mexico, my attention was attracted to a disturbance in the water approximately one hundred yards off shore. Closer inspection with field glasses revealed that a school of small fish was being preyed upon by larger fish at a point where the shallow waters of the bay met the deeper channel of the inland waterway. Within a few minutes a flight of 15 or 20 brown pelicans (*Pelecanus occidentalis*), which had also apparently been attracted by the commotion, began diving into the school and feeding on the small fish.

As the school of fish moved away the pelicans followed, still diving and feeding, with the exception of one male which remained behind on the water, apparently in some difficulty. A breeze from the southeast carried the bird toward shore as its struggles became weaker. Within twenty minutes the bird had ceased activity, except for a slight movement of the head and neck. When the dead pelican was examined a large living fish was found lodged in the pouch. It was probably the movement of the fish which was responsible for movements of the head and neck of the bird just before it was picked up. The fish, a sheepshead (*Archosargus probatocephalus*), measured about 15 inches in length and 17 inches in girth and was estimated to weigh about six pounds. The position of the fish in the pouch was such that the snout of the fish apparently interfered with the glottis of the pelican. A little water was found in the trachea and lungs of the pelican, and it was assumed that the bird died of suffocation hastened by exhaustion from struggling.

The bird had been unable to disgorge the fish because the width of the fish's body was more than an inch greater than the space between the lower jaws. It was necessary to slit the pouch of the pelican to remove the fish for examination. Experimentation demonstrated that the fish slid into the pouch quite easily by springing the lower jaws apart, but it was impossible to remove the fish, tail first, through this opening without injuring the bill. It was also impossible to turn the fish end for end within the pouch.

The question which naturally arises is whether the pelican purposely attacked such a large fish, or if, by a freak circumstance, the fish was engulfed by accident. The latter could occur if the pelican and sheepshead had arrived simultaneously at the

same target (that is, some smaller fish on the surface of the water), one from above and the other from below. Evidence for this explanation lies in the fact that the sheepshead rarely comes to the surface except for swift, nearly vertical lunges for food, after which it returns to deeper water immediately. Also the fact that the sheepshead could enter the pelican's beak at only one angle indicates that they must have met head on.—Donald E. Stullken, *Department of Animal Physiology, Purdue University, Lafayette, Indiana.*

Brown pelican on the coast of Surinam, Dutch Guiana.—Murphy (Oceanic Birds of South America, pp. 130–131, 1936) discusses at length the oceanic conditions which prevent brown pelicans (*Pelecanus occidentalis*) from extending their normal range much to southeastward of the point at which the southern end of the Antillean arc approaches the mainland. He further states that "Brown Pelicans have, of course, been reported from the coast of the Guianas and even from inland waters of the Amazon" and concludes: "all such records, however, appear to be based upon wandering individual birds." His opinion is that "the muddy water of this coast is the factor that limits the southeastward extension of the Brown Pelican's distribution so abruptly in the neighbourhood of Trinidad."

As to British Guiana all records seem to go back to Schomburgk (Reisen in Britisch-Guiana in den Jahren 1840–1844, 2: 456, 1848), and Young (Ibis, 1928: 751–752) does not mention the pelican in his account of the coast between the Corantyne and Demerara rivers. The Penard brothers (Vogels van Guyana, 1: 76, 1908) state that this bird is only of irregular occurrence on migration in the Guianas but give no further details. Count Hans von Berlepsch (Nov. Zool., 15: 312, 1908) does not list the brown pelican for French Guiana, but there are at least two records in Brazil (Snethlage, Catalogo das Aves Amazonicas, 120, 1914, and Pinto, Catalogo das Aves do Brasil, 1: 25, 1938).

According to my observations during the last two years the brown pelican is of regular occurrence on the coast of Surinam, Dutch Guiana, but only in small numbers. Starting in the northwest of the country my list of records is as follows: coast east of Nieuw Nickerie, August 17, 1947, two birds; coast near Coronie, July 9, 1946, one bird; tributary of Saramacca and Coppename rivers, April 23, 1947, six birds (at least three of them in adult breeding plumage), May 10, 1947, two in adult breeding plumage, June 5, 1948, three, June 6, 1948, nine, July 10, 1947, four, July 11, 1947, twenty, August 7, 1946, eleven at least two in adult breeding plumage, August 24, 1947, seventeen, September 10, 1947, twenty, September 13, 1947, two; coast west of tributary of Surinam River, October 10, 1947, two birds, November 21, 1946, two, December 7, 1946, one bird in adult breeding plumage.

The best locality, however, seems to be the tributary of the Saramacca and Coppename rivers where large sandbanks are found teeming with waterfowl and where the pelicans can regularly be found sitting on stakes put in the shallow water by fishermen. On this shallow and muddy coast the pelicans cannot dive from the air as is their regular fishing method in deep water. On July 11, 1947, I accompanied a fisherman in the tributary of the Saramacca and Coppename rivers. There were about 20 brown pelicans fishing in our immediate neighborhood undisturbed by the presence of our small boat. They fished in exactly the same way as described for the white pelican by Bent (U. S. Nat. Mus. Bull., 121: 288, 1922) quoting observations by Goss, "swimming on the water with partially opened wings, and head drawn down and back, the bill just clearing the water, ready to strike and gobble up the prey within their reach."

There are no indications that these birds ever breed along this coast. My records

on the other hand prove that the brown pelican is present on the coast of Dutch Guiana during at least nine months of the year, though I did not visit any likely locality in March. The nearest breeding colonies seem to be on small rocky islands off the northern coast of Tobago and the northern coast of Trinidad (Harrison, Ool. Rec., 18: 90–93, 1938), which are not mentioned by Murphy.—Fr. Haverschmidt, *14 Waterkant, Paramaribo, Surinam.*

Booby's beak imbedded in black marlin's back.—Observers of the large flocks of gannets, boobies and pelicans which feed in coastal waters, habitually by diving for their prey from considerable heights, can not fail to contemplate the potential accident rate incident to this feeding technique. Evidence that accidents occur, at least occasionally, was found by the Mandel-Chicago Natural History Museum Galapagos Island Expedition in 1941.

A large black marlin (*Makaira marlina*), caught January 20 approximately three miles southeast of Tower Island, had the left mandibular ramus of a booby (*Sula* sp.) deeply imbedded in its back. The beak fragment was 98 millimeters long and, although completely encysted, still retained some musculature attached to the basal portion.

This recalls Bent's reference (U. S. Nat. Mus. Bull. 121: 226, 1922) to an unauthenticated report of gannets being killed by diving into a floating board upon which a fish had been fastened.—Emmet R. Blake, *Chicago Natural History Museum, Chicago, Illinois.*

The little blue heron in Ontario.—A specimen of the little blue heron (*Florida caerulea*) was recently acquired by the Royal Ontario Museum of Zoology from the Ontario Department of Lands and Forests. The bird was found dead with its feet frozen in the ice, on December 16, 1947, on the French River in Delamere Township, Sudbury District, Ontario, by Overseer K. P. McGilvary. When later dissected at the museum, it proved to be a juvenile male. This is the most northerly occurrence for the little blue heron in Ontario and also the first in winter for the Province. Previously the most northerly record was one bird taken in a muskrat trap on March 28, 1929, at Atherley Narrows in Simcoe County (Devitt, Trans. Roy. Canad. Inst., 24: 258, 1929).—C. E. Hope, *Division of Ornithology, Royal Ontario Museum of Zoology, Toronto, Canada.*

Green heron feeds on goldfish.—On April 8, 1946, at 11:20 a. m., my attention was called to a bird perched on a trellis in our back yard which is in the residential section of Madera, California. The bird proved to be a green heron (*Butorides virescens*). The bird peered around, seemed undisturbed by sounds coming from the adjacent street, and finally flew across the street to perch fairly high in a pecan tree. The bird was next seen at 1:00 p. m., when it flew from the house next door and perched in our English walnut tree.

By this time I suspected that it might be interested in the many goldfish in the pond next door. At 1:25 p. m., it flew down from its perch to the middle of our garden. It peered about for nearly five minutes, then craned its neck in the direction of the fishpond and made its way carefully in that direction. Upon reaching the pond it spent 10 minutes trying to get through the 16-inch, chicken wire fence that protected the pond on the lawn side. The bird seemed to try to push its way through, much as it would in tules or grass stems, but of course it was unsuccessful. After each attempt it would stop and survey the situation, then try again. Not once did it attempt to fly upon or over the fence. It then worked its way all along this fence

finally giving up. After some time it walked around to the other side and came out on the pond's unprotected side.

It crouched with its beak down and almost aimed at the water and then it relaxed. It repeated this performance several times in a period of about ten minutes. It then crouched and appeared to jump, not dive, in. The first attempt was unsuccessful, but immediately it tried again and this time came up with a goldfish. This was held crosswise in the bill, shaken vigorously several times and then swallowed. The bird again took up its stance, but it was frightened and flew back to the walnut tree. It did not fly far or seem too wary, but seemed loathe to leave the locality. The owner of the fish shot the bird, and I secured it. Upon skinning it was found to be a female with the ovary well developed. The stomach contained the goldfish measuring 100 by 29 by 20 millimeters and weighing 15.8 grams. It also contained the remains of two small fish and several beetles. Barker (Bird-Lore, 3: 141, 1901) and Brooks (Auk, 40: 121–122, 1923), report a similar type of activity.—ALBERT C. HAWBECKER, *Fresno State College, Fresno, California.*

Yellow-crowned night heron in Rockingham County, Virginia.—On April 19, 1948, I saw a yellow-crowned night heron (*Nyctanassa violacea violacea*) along the bottomland of North River just below the town of Bridgewater. The bird was quite tame and allowed me to get right under the tree in which it was perched.

The following day the bird was not seen, although a thorough search was made throughout the river bottoms. Then at noon on April 21, the heron was flushed along with two little green herons from the rocky spillway under the same willow tree where it was first seen. The bird was collected; examination disclosed developing eggs with one egg about the size of a marble, which had not yet moved down the oviduct.

The only definite previous record listed for western Virginia is of a bird shot on July 11, 1923, at Boyce, Clarke County and published (Auk, 43: 538, 1926) by B. H. Swales.

The skin has been placed in the United States National Museum, Washington, D. C. I wish to thank Chandler S. Robbins of the Fish and Wildlife Service who kindly checked the distribution files for records of the yellow-crowned night heron.—MAX M. CARPENTER, *Bridgewater College, Bridgewater, Virginia.*

The wood ibis in Ontario.—Fleming (Auk, 30: 226, 1913) has recorded the occurrence of the wood ibis, *Mycteria americana*, in Ontario, based on a drawing of a dead bird, one shot by a farmer near Simcoe, Norfolk County, in November, 1892. The drawing, now preserved in the Royal Ontario Museum of Zoology, is unmistakably of the species concerned and the documentation exceptionally complete. However, there is some dissatisfaction in resting the validity of the first and only Provincial occurrence on a drawing of an unpreserved bird made at some remote time and place.

There is some gratification then in being able to record this species for the Province on evidence which is beyond doubt. On August 2, 1948, a wood ibis was killed in the extreme eastern part of southern Ontario, township of Charlottenburgh, County of Glengarry. An overseer of the Fish and Wildlife Division of the Department of Lands and Forests, Mr. E. W. Munro, seized the bird which he "thought to be a Wood Ibis" and forwarded it to the Department in Toronto from whence it was turned over to the Royal Ontario Museum of Zoology where its identity was confirmed. The specimen is now number 76069 in the museum's collection.—L. L. SNYDER, *Royal Ontario Museum of Zoology, Toronto.*

Acquired feeding behavior in mallards.—On several occasions the ducks in the J. Rulon Miller wildlife enclosure (McDonogh School, McDonogh, Md.) were fed dry corn meal. This was placed in a pan about fifteen feet from the water. Domestic ducks (pekins and muscovies) ate this without any difficulty but the wild ducks, ten mallards (*Anas platyrhynchos*) and one black duck (*A. rubripes*), after a few coughing noises, returned to their usual occupation of dabbling in the pond. These wild ducks were reared from eggs obtained through the kindness of Mr. E. A. Vaughn, Maryland State Game Warden. On September 16, 1947, it was first noticed that one female mallard had solved the problem of eating this meal. She would scoop up a mouthful, run for the pond, wash it down and hurry back for another load. She made continuous, rapid trips in this fashion. The other mallards at this time took no interest in the meal even when it was moistened with water until crumbly and placed at the pond's edge.

On September 26, the ducks were again offered corn meal. Upon this occasion they were very hungry as they had been fed very sparingly the day before. The female mallard began to feed immediately in the same fashion as before; her peculiar method of running served to distinguish her from the other birds. Several other mallards and one black duck sampled the corn meal. This time they followed it with bits of leaves (black duck) or dirt (mallards), but the results were similar to those observed on earlier trials, they were unsuccessful and soon returned to the pond. In this as in the following trials, any uneaten meal was removed at the conclusion of the experiment.

The next day the ducks were very hungry as they had now been fed only very sparingly for two days. Several mallards were observed to make one or two casual, neither direct, hurried nor persistent, trips to and from the water and the meal. Only one duck was continuously and purposefully running to and from the water, this being the female noted above.

No further attempts were made to speed the learning by withholding food, the food being offered on the dates referred to below. On October 19 three additional mallards were seen to make regular trips to and from the corn meal and the pond. Two others made casual trips and several sampled the meal and returned to the pond without feeding. On October 22 all the mallards almost immediately engaged themselves in regular trips to and from the pond. The black duck, by this time, had apparently lost all interest in the meal. Two mallards, however, continued to eat the meal even though offered whole corn as a choice after they had started feeding on the meal. On November 6 the ducks were again offered corn meal. All the ducks (domestic and wild) made regular trips to and from the water except two young muscovies (about two months old), their mother and three mallards that persisted in staying near the observer. The black duck made only two trips. This was the first time that any of the domestic ducks or the black duck were observed eating the corn meal in this fashion.

These observations, while not complete, do suggest that mallards may, on occasion at least, be slow in changing their food habits and in this respect resemble several other species of diverse habits (see Cushing, The relation of non-heritable food habits to evolution, Condor, 46: 256–271, 1944, for further references).—A. O. Ramsay, *McDonogh School, McDonogh, Maryland,* and John E. Cushing, Jr., *Johns Hopkins University, Baltimore, Maryland.*

Barrow's golden-eye near Waddington, New York.—Barrow's golden-eye (*Bucephala islandica*) is a rare winter visitant on all inland waters of New York, and

only two published records are available from the St. Lawrence River section of the state. The first of these dates back to 1865 when, according to Eaton (Birds of New York, 1: 211, 1910), D. G. Elliot took about 40 specimens. The second, supported by a single specimen, likewise refers to the last century, about 1898 (Hasbrouck, Auk, 61: 552, 1944). Because of this scarcity of records it seems that the following should be recorded.

On December 19, 1943, State Game Protector Marvin R. Nichols, Massena, New York, was hunting with a friend on Allison Island in the St. Lawrence River not far from the village of Waddington. During the day his friend shot at close range a drake Barrow's golden-eye in full adult plumage, mutilating the body of the bird beyond repair. However, Nichols mounted the undamaged head and neck. The writer saw the specimen in the spring of 1946 and was kindly given permission to borrow it.

All the important characters used in identifying the adult male Barrow's golden-eye were clearly apparent. The abruptly rising forehead, the frontal protuberance, the rounded crown, the large, white fully-formed crescent before the eye, and the purple gloss of the head stood out in sharp contrast when compared with a specimen of an adult drake American golden-eye (*Bucephala clangula americana*).

Because of the low population of Barrow's golden-eye in northeastern North America and its tendency to occur more often in coastal and tidal waters, it is not to be expected that the species would appear with any degree of frequency in the New York section of the upper St. Lawrence River. On the other hand, by reason of the very limited number of competent observers in the region, it seems questionable whether this golden-eye is as extremely rare as published records indicate.—H. L. Kutz, *University of Maine, Orono.*

Surf scoter records from Georgia.—In the spring of 1947, Mr. Isaac F. Arnow, retired ornithologist and taxidermist of St. Mary's, Georgia, donated more than 400 bird and mammal skins to the University of Georgia Museum, and among these skins were three scoters, all collected by Mr. Arnow. The writer identified the birds as surf scoters (*Melanitta perspicillata*). This identification has been confirmed by Dr. Alexander Wetmore who examined the specimens. The three birds are labelled as follows:

"No. 652, Collector: I. F. Arnow, Locality: Cumberland Jetties, Camden Co., Ga., Mch. 19, 1904. Male."

"No. 558, Collector: I. F. Arnow, Locality: North Jetties Cumberland Sound, C. Co., Ga., Nov. 17, 1903. Female."

No. 559. Label partly obliterated by a stain but these words are still legible: " . . . nd, C. Co., Ga., Nov. 17, 1903. Male." Sub-adult plumage.

Since specimens 558 and 559 were taken on the same day by the same collector, there is little doubt that they were collected at the same locality. In any case it is certain that they are all from Georgia.

In "Birds of Georgia" (Greene, *et al:* p. 33, 1945) the placing of the surf scoter on the state list is based upon three sight records on the coast. These three specimens, then, are perhaps the only known specimens of this bird from Georgia.—David W. Johnston, *Department of Biology, University of Georgia, Athens, Georgia.*

First occurrence of the black vulture in Ontario—A specimen of the black vulture (*Coragyps atratus*) was received in July, 1947, by the Royal Ontario Museum of Zoology through the kindness of Overseer A. R. Muma, Chippawa, Ontario, of the Ontario Department of Lands and Forests. The specimen was preserved as a study

skin. The bird, an adult male in worn breeding plumage, was collected on July 21, 1947, in Stamford Township, Welland County, Ontario, about four miles north of Niagara Falls by A. R. Muma and Marion Miles. This is the first occurrence of this species in the Province of Ontario.—C. E. Hope, *Division of Birds, Royal Ontario Museum of Zoology.*

The Mississippi kite along the Savannah River in Georgia and South Carolina.—Dr. Eugene E. Murphey has given a good account (Contrib. Charleston Mus., IX: 10, 1937) of the Mississippi kite, *Ictinia misisippiensis*, along the Savannah River below the Fall Line at Augusta.

It was my good fortune to be sent on an inspection trip down the Savannah River by boat on May 22 and 23, 1948, covering the entire river from New Savannah Bluff Lock and Dam, at mile 187, about 12 miles below Augusta, to mile zero at Savannah. The entire trip was made in daylight hours, and except for a few minutes at a time, I was on deck constantly.

From the Lock and Dam, we saw one or two kites very frequently until we reached the vicinity of Little Hell Landing at mile 135. From that point down none were seen, though there was no perceptible change in the forest encountered. It is unlikely that there were any kites below that point, or we would have seen a few at least. Though the river distance is about 187 miles, it is in air miles only about 100.

At this time of spring, the kites should be present and nesting. Thus it seems that the summer range along this river is limited to Richmond and Burke counties, in Georgia; and to Aiken, Barnwell, and possibly the northwest corner of Allendale counties, in South Carolina.—Ivan R. Tomkins, *1231 East 50th St., Savannah, Georgia.*

***Ictinia misisippiensis* collected in Paraguay.**—The winter range of the Mississippi kite is imperfectly known, but hitherto it has been regarded as extending southward only to Guatemala. The species is uncommon, or of only casual occurrence in the southern portion of its winter range, and the single record for Guatemala is based upon a specimen collected near Coban, in Vera Paz, during the last century (Salvin, Ibis, 1861: 355).

Two adult Mississippi kites collected at Colonia Nueva Italia, Dept. Villeta, Paraguay, on February 26, 1942, and December 14, 1944, by Pedro Willim extend the currently accepted winter range of the species southward by almost 4000 miles. Both specimens (C. N. H. M. Nos. 102966, 152816) are females in mature plumage, with no evidence of unusual wear, and are indistinguishable from a series of birds from Texas and Florida.

The status of this North American species in Paraguay is, of course, uncertain. However, a note written by the collector on the label of the 1944 specimen states that the species appears in small numbers from October to February almost every year, but only with a south wind during stormy weather, when the barometer is very low. It is not known definitely that Mr. Willim's field identification of *misisippiensis*, as distinguished from the common resident species (*plumbea*), is dependable, but it is noteworthy that his observation is supported by two specimens collected in different years.—Emmet R. Blake, *Chicago Natural History Museum, Chicago, Illinois.*

A new hawk from India.—Crested goshawks from the Indian Peninsula are usually considered to belong to the nominate race (type locality: Sumatra). A comparison of Indian and Sumatran material, however, has shown that the Indian birds belong to an undescribed subspecies:

Accipiter trivirgatus peninsulae, new subspecies

TYPE: Adult female; Londa, Bombay Presidency; January 21, 1938. W. Koelz collection (deposited in the American Museum of Natural History).

Differs from *trivirgatus* in the plumage of the adult male by having fewer but darker spots and stripes underneath. Breast shield earthbrown, reduced in size and mixed with much white; bars on abdomen and thighs narrower and blackish. The adult female differs by having the breast darker, more blackish brown; on abdomen and flanks the white bars are broader and the dark bars narrower. Size as in *trivirgatus*.—W. KOELZ, *Care of American Consul, Bombay, India.*

Nesting of a Swainson's hawk in Illinois.—On May 18, 1947, near Rockford, Winnebago County, Illinois, we found the nest of a Swainson's hawk (*Buteo swainsoni*). The female was incubating, and a sharp rap on the tree trunk sent her hurriedly in flight from the nest. The male flew out from a nearby tree where he had been perched unobserved by us, and joined her. The nest containing three eggs was built 65 feet high in a basswood tree.

All three of the eggs hatched on June 5. On June 15, the parent birds were not seen. The nest contained two partly eaten thirteen-lined ground squirrels. On June 22, pin feathers were beginning to show on the young; on July 6, the young were almost completely feathered. They were not able to fly as yet, however, and climbing to the nest again, I removed one of the young for study at home. This bird learned to fly in two weeks. This, I believe, is the second record of Swainson's hawk nesting in Illinois.—DON S. PRENTICE, *5216 East Drive, Rockford, Illinois.*

Concentrations of bald eagles on the Mississippi River at Hamilton, Illinois.—Bald eagles (*Haliaeetus leucocephalus*) have been seen at Keokuk in small numbers for more than a half century. Originally they were attracted by offal thrown into the river from the pork packing houses to the south. The water of the river was almost always open during the winter due to the Des Moines rapids; an occasional dead fish along with the offal supplied an abundance of food.

The packing houses are gone, yet recently the number of these great birds has increased due to the fact that the water below the Keokuk dam is always open, and an abundance of fish are killed as they pass through the turbines which are creating electricity. As this food is retrieved by the gulls and dragged onto the ice, it is taken by the eagles who in turn must protect it from crows which crowd about hoping to filch a particle of flesh which falls away or is left untouched.

In the winter of 1947 and 1948, there was the largest accumulation of eagles in the history of this location. Mr. Cyrus Phillips makes almost daily trips through the territory in which these birds roost and reports that he counted 83 eagles at one time. Mr. W. G. Ingram reported 59 birds during the week of February 14, 1948. Mr. L. E. Dickinson reported seeing 56 birds at one time on February 15, 1948. Mr. Maurice Dadant reports that his salesmen saw 35 eagles on several occasions. The writer has seen from 20 to 30 birds on three occasions resting in groups of cottonwood trees.

The public is so interested that so far as known, not a single bird has been disturbed with rocks or gun within the last five years. The largest accumulations gather on cloudy or stormy days. The birds start to gather about December 15, and fly north about February 15 when the upper river begins to open. Anyone crossing the Mississippi bridge at Keokuk between these dates is assured of a sight of these great American birds.—T. E. MUSSELMAN, *Quincy, Illinois.*

Comparison of 1935, 1940, and 1946 populations of nesting bald eagles in east-central Florida.—In earlier reports of this study (Auk, 54: 296–299, 1937, and Auk, 58: 402, 1941) I have presented data showing a decrease in the density of nesting bald eagles (*Haliaeetus leucocephalus*) in Florida along the Indian River in Brevard and Volusia counties between the cities of Cocoa and New Smyrna.

In 1935, I visited the nesting sites of 24 pairs of bald eagles. The areas within a radius of one mile of each of these nesting sites were selected as a composite study area in which to observe the population trend. By 1940 the population in this study area was reduced to 20 pairs of eagles. Thus the population had decreased almost 17 per cent in five years. In 1946 the population of the study area was 17 pairs of eagles. During this period of six years the population decreased 15 per cent. In the eleven years since the start of this study the population in this sample area has decreased almost 30 per cent.—JOSEPH C. HOWELL, *University of Tennessee, Knoxville, Tennessee.* (Contribution No. 19, from the Department of Zoology and Entomology.)

A new button-quail from New Guinea.—In a small collection of birds from New Guinea assembled by Mr. J. Frank Cassel and presented by him to Cornell University, there is a specimen of the spotted button-quail, *Turnix maculosa*. It was collected near Finschhafen, in northeastern New Guinea. Mayr (1941) lists only one subspecies of button-quail, *Turnix maculosa horsbrughi*, from New Guinea, for which he gives the range as follows: "South New Guinea from the Merauke district to the Aroa River and Port Moresby; Sudest group (Tagula, Veina), Louisiade Archipelago. Grasslands up to 100 m." Even the most superficial comparison of the Finschhafen specimen with specimens of *T. m. horsbrughi* in the American Museum of Natural History sufficed to show that it was not of that race. Since Finschhafen is isolated from the normal range of *horsbrughi* by a series of mountain ranges, and since grassland areas suitable for *Turnix* in New Guinea are discontinuous, it is not surprising that this specimen proved to be most like *saturata* of New Britain, directly across the Dampier Straits from Finschhafen. As there are to my knowledge no female specimens of *T. m. saturata* in any museum in North America, I borrowed such a specimen from the British Museum through the courtesy of Mr. J. D. Macdonald of that institution. The Finschhafen specimen proves to be neither *horsbrughi* nor *saturata*, but an apparently undescribed race, which I propose to name as follows:

***Turnix maculosa furva*, new subspecies**

TYPE: Female, Louis Agassiz Fuertes Memorial Collection (no. 21393), Cornell University; Gusika, ten miles north of Finschhafen, New Guinea, one-eighth mile from coast, altitude 150 feet (estimated); July 9, 1944; J. Frank Cassel, collector, original number NG 5.

DESCRIPTION: Darkest of the races of *Turnix maculosa*. Closest in size to *T. m. horsbrughi* of southern New Guinea, agreeing exactly in this respect with one specimen from the Fly River, but very different in color from that race. Closest in color to *T. m. saturata* of New Britain, but differs in being smaller and everywhere darker; throat, breast, belly and flanks are deeper rufous than in *saturata*, being almost chestnut in color; ochraceous color of the outer edges of the wing-coverts and tertials is deeper, and the buffy edges of the scapulars narrower than in *saturata*. A broad rufous nuchal collar is typical of *horsbrughi* and is present in the type of *salmonis* from Guadalcanal; this collar is absent in *saturata*. In the type of *furva*, there is a faint indication of a rufous wash on three or four of the nuchal feathers. The light

central crown-stripe is absent or barely indicated in *saturata*, present (although narrow and interrupted) in the type of *furva*. The crown-stripe is subject to much individual variation in this species as a whole. The ground color of the upper parts is seen in good light to be everywhere blacker (less grayish) in *furva* than in *saturata*. The iris is brownish yellow (usually listed as white for other races of *Turnix maculosa*), the bill yellow, and the feet and legs "topaz tinted yellow" (original label).

DISCUSSION: The bill of the type specimen of *Turnix maculosa furva* is rather remarkable in shape, being quite different from that of any examined specimen of this species. The upper mandible possesses an arched keel, making the distance between the culmen and the upper edge of the nostril noticeably greater than in any other specimen of this species. The upper mandible is also produced into a longer point than is normal in this species. I have hesitated in embodying this peculiar bill shape in the subspecific diagnosis because of the possibility of this being an aberration. Ernst Mayr, James P. Chapin and Jean Delacour have all examined this specimen, and are unanimous in their belief that this bill shape is most probably an abnormality.

TABLE 1

MEASUREMENTS IN MILLIMETERS OF FEMALE BUTTON-QUAIL

Specimen	*Wing (flat)*	*Tarsus*	*Culmen*
T. m. furva			
Finschhafen, New Guinea (type)	80	20	14
T. m. horsbrughi			
Aroa River, New Guinea	78	23	13
Fly River, New Guinea	80	20	13
Tagula Is., Louisiade Group	72	19	12
Tagula Is., Louisiade Group	71	20	12
T. m. saturata			
Blanche Bay, New Britain	85*	22	13
T. m. salmonis			
Guadalcanal, Solomon Is. (type)	85	20	12.5

* The wings of two other specimens of *saturata* examined by Dr. Mayr at the British Museum also measured 85 millimeters.

Button-quails of this species are very rare in collections. They are shy and secretive in their habits, and often exceedingly difficult to collect. This fact has helped to counteract my hesitation to describe a new subspecies from a single specimen. In a somewhat parallel instance, Mayr (1938) described *T. m. salmonis* from Guadalcanal on the basis of a single specimen (the species never having been previously known from the Solomon Islands). This bird has since been rediscovered (Pendleton, 1947, and others). It is hoped that some day new observations will be made of *furva*.

While examining specimens of the various races of *Turnix maculosa* preparatory to the writing of this paper, I was struck by the marked need of a revision of this entire species. The arrangements presented by Mathews (1927) and by Peters (1934) are unsatisfactory. The easternmost races of the species are fairly well-marked as presently understood, although I agree with Mayr (1938) that the bird of the Louisiade Archipelago will eventually prove to be separable from *horsbrughi* of southeastern New Guinea, for it seems to be strikingly smaller. The more western races, however, are badly confused. The races of the Lesser Sunda Islands and of Australia are in great need of rearrangement. The group of birds now united as *Turnix maculosa maculosa*, for instance, consists of at least two recognizable races. However, as

Mayr (1938, 1944) comments, a thorough revision of this species must await the assembling of more and better material than is now available.

I am indebted to Dr. Ernst Mayr for much help and advice, and for the use of his notes on certain *Turnix* specimens in the British Museum. Mr. J. D. Macdonald of the latter institution kindly arranged to lend me one of the few known specimens of *T. m. saturata*. I also wish to thank Mr. Dean Amadon, Dr. James P. Chapin, and Capt. Jean Delacour for their many suggestions.

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—Kenneth C. Parkes, *Laboratory of Ornithology, Cornell University, Ithaca, New York.*

The status of the spotted rail, *Pardirallus maculatus*, of Chiapas.[1]—In the Auk (64: 460, 1947) I recorded that Señor Miguel Alvarez del Toro had informed me of the capture alive near Tuxtla, Gutierrez, Chiapas, of a spotted rail, a bird new to the Mexican avifauna. He supplied a photograph of the bird which clearly confirmed his identification. As the bird was then living in captivity and was in very worn plumage, I suggested that it would be useless for comparison and that it would be better to wait until it had grown fresh plumage before preserving it as a specimen. This has now transpired, and some time ago, I was pleased to receive the skin for examination. Inasmuch as the nearest locality from which the species had been recorded previously was the Ycacos Lagoon, British Honduras, whence only one specimen has been taken, the type of *insolitus*, it was imperative to compare the two birds.

I am indebted to Mr. J. L. Peters of the Museum of Comparative Zoology for the trouble he has taken in comparing the Chiapas specimen with the type of *insolitus*, and in writing me of his observations. He notes that the Chiapas specimen has more white in its plumage, partly but not wholly, due to the freshness of its feathering, as the type of *insolitus* is somewhat abraded and the pale edges of its feathers are partly gone. However, the white bars (not subject to abrasion) on the feathers of the abdomen, flanks and crissum are about twice as wide in the Chiapas specimen as in the Ycacos bird, and the black bars are correspondingly reduced in the former. Also, the white spots on the tertials are more linear, less rounded in the type of *insolitus* than in the Chiapas example.

Among a small series of specimens of the nominate form examined, I have seen two from the Paraguayan Chaco, one of which has the white ventral bars very much broader than the black ones and the other has the black ones wider than the white ones. I hesitate, therefore, to attach too much value to this character in differentiating the Chiapas bird from the one from British Honduras.

[1] Published by permission of the Secretary of the Smithsonian Institution.

When Bangs and Peck described *insolitus* they remarked on the fact that the brown portions of the plumage (wings, back, rump) were much darker than in South American *maculatus*,—Seal brown instead of Mummy brown. The Chiapas bird is extremely nigrescent; the back and rump feathers are black, edged with Natal brown, the remiges are clipped, but the primaries, insofar as they can be judged, are deep clove brown, the scapulars and upper wing coverts are black, tipped and basally edged with Natal brown, and with white marginal markings; the feathers of the upperback, interscapulars, and hind neck are black with white spots. It is conceivable that with wear and fading, all these black areas might turn to dark Seal brown, as in the somewhat worn type of *insolitus*, but it is also not improbable that the Chiapas bird may represent a new form comprising the dark extreme of the species. What is needed is additional material from both southern Mexico and British Honduras. For the present it seems that the two specimens should be considered as of the same race. The known range of *insolitus* is thereby extended from Ycacos Lagoon, British Honduras, northwestward to Tuxtla Gutierrez, Chiapas, Mexico.

In response to my suggestion that he keep detailed notes on the bird while it was still alive, as nothing is known of its habits, Señor del Toro has supplied me with the following observations.

In captivity the bird ate dried insects and cooked rice with apparent relish, it also seemed to like fresh insects, dragonflies, and larvae and pupae of wasps, and also chopped meat. The bird would pick up the food in its bill and then take it to its water pan where it would eat it.

Almost all day the rail remained hidden among some plants, especially fairly high up in the branches of a shrub in the large cage in which it was kept; from this perch it descended now and then, chiefly in the early morning and late afternoon, to eat and to bathe in the shallow water pan. After splashing about in the shallow water, it usually preened its plumage, sunned itself for a while, and then climbed up to its favorite perch among the branches. In climbing to the perch it always ran upward on the branches or the wire mesh, helping itself along with its wings, but in descending it merely flew down.

The bird became tame very soon after its capture, almost taking food from the hand. The only notes it was heard to utter were high pitched cries.—HERBERT FRIEDMANN, *United States National Museum, Washington, D. C.*

The Pacific flyway of the golden plover.—Almost all recent discussions of bird migration include a comment of astonishment at the feat of the Pacific golden plover (*Pluvialis dominica fulva*), in passing each year from the Aleutians to Hawaii over 2400 miles of open ocean. The astonishment is not so much at the great length of the trip, as at the featurelessness of the terrain, "without even an island or a rock to serve as a landmark" (MacDonald, Birds of Brewery Creek. (Oxford Univ. Press), p. 13, 1947); or again, "The Golden Plover performs *with no landmarks* over the broad expanses of the Pacific Ocean" (Yeagley, Journ. Appl. Physics, 18: 1035–1063, 1947), or still again, "Since *there are no 'sign posts' of any kind* (italics mine) over the ocean wastes, the flights (of the albatross) must involve true navigation until the island home comes into view" (Yeagley, *loc. cit.*).

The purpose of the present note is to point out that the Pacific is not one vast, featureless expanse, merely because solid land is scarce. Some of the most spectacular "sign posts" of the planet lie over the oceans.

Thus, off the coast of California is a "landmark" which must, to a dweller on Mars or the moon, appear to be one of the most brilliant features of our planet. In July,

starting at the coast at San Francisco and extending 800 miles out to sea in the direction of Hawaii, is a brilliant white band paralleling the coast. It is a belt of clouds, like a white quilt, with scarcely a hole through it. The base of the clouds is sometimes not a thousand feet above the sea; its upper surface is only a matter of a few hundred feet higher; but this stratum of air is a solid blanket of cloud. Above it is brilliant sunshine; below it is cold. The clouds apparently lie over the California Current.

The position of this current varies somewhat with the seasons. The extent of the cloud canopy (according to a report from Pan-American Airlines) varies considerably with the seasons. But during part of the year, at least, an aviator or bird could fly a course parallel with the coast and nearly a thousand miles out to sea, by following the seaward margin of the solid cloud. Beyond the 800-mile point, or thereabouts, the cloud topography is different. It consists of scattered low cumulus clouds. The base of these cumulus clouds seems often to be at about a thousand feet; their tops may be a thousand or sometimes two thousand feet higher. They occupy only a minor fraction of the total area.

The West Wind Drift or Current circles eastward past the Aleutians, and then under the name of the California Current flows southward down the coast to the edge of the tropics, where it turns westward directly toward the Hawaiian Islands, to become the North Equatorial Current in the latitude of Mexico. If the cloud canopy follows it, a bird has only to follow the cloud to find itself within sight of these islands. Among the small cumulus clouds in this area are a few towering giant ones where the trade winds striking the Pali [cliffs], and steep slopes of the islands, go shooting upward. No better beacon would be asked, in the morning sun, for a bird approaching from the east. The volcanoes of the southeastern islands are almost 14,000 feet high, and if the air were clear enough they would be visible to a bird flying at an equal height nearly 300 miles away.

It is not the purpose of this note to suggest that the plover does fly at a great height, or that it does follow the cloud or other, perhaps more subtle, differences in cloud topography or ocean features; this may, or may not, be the case. My purpose is to utter a word of warning against the assumption that the ocean is featureless, merely because it is so shown on a map.—F. W. Preston, *Butler, Pennsylvania.*

Aquatic snails eaten by woodcock.—An American woodcock (*Philohela minor*) was accidentally killed in a muskrat trap set along the edge of Breakneck Creek, Rootstown Township, northeastern Ohio, on November 29, 1947. It is uncommon for this species to be in the locality at that date, since most of the woodcock leave this region in October. On request, the viscera were given to the writer by the trapper, William Winnefeld, and his uncle Bernhard Raithel. The woodcock is reported to feed almost entirely on earthworms and grubs. Three species of aquatic snails made up the bulk of the contents of the digestive tract of this specimen. The crop was filled with eight *Physa gyrina* and two *Gyraulus parvus*. In the gizzard were one *P. gyrina*, ten *G. parvus* and one *Paludestrina nickliniana*. Fragments of a weevil were also present. The bird was probably killed while engaged in hunting snails along the shallow waters of the creek.—Ralph W. Dexter, *Kent State University, Kent, Ohio.*

***Hoploxypterus cayanus* in Colombia.**—On February 14, 1948, while Mrs. Grinnell and I were travelling in a small motor boat on the upper Meta River, in the Llano country, a few miles below Puerto Lopez, in the Department of Meta, east of the Andes, we saw two unfamiliar, medium-sized plovers, feeding along the edge of a

sand bar. We landed on the bar, observed them with 8 x 30 field glasses, and took moving-pictures of them, using a 6 inch telephoto lens. As Chapman's "Distribution of Bird-life in Colombia" failed to list this species we were unable to identify it at the time, nor did we collect it, but after having later checked the specimens of the Charadriidae in the American Museum, New York, the unique posterior crown pattern of a white circle, bordered with black, and containing an inner grayish patch (features distinguishable in our movies), together with its black chest band, were sufficient characteristics to place it as the Cayenne plover. Peter's "Birds of the World" gives its distribution as "Southern Venezuela (Orinoco Valley) and the Guianas south through eastern Ecuador, eastern Peru and eastern Bolivia to Paraguay and southern Brazil," but does not include Colombia. I find no other reference to it in the literature of the last twenty years.—LAWRENCE I. GRINNELL, *Ithaca, New York.*

A preening phalarope (*Lobipes lobatus*).—On October 5, 1947, along the coast of the Yselmeer, the former Zuiderzee, near Schellinkhout, some five kilometres west of Hoorn, Holland, I noticed a northern phalarope swimming in the quiet water close to the base of the dike.

As is the case in all phalaropes, the bird was exceptionally tame and allowed me to approach up to a distance of less than one meter. I studied it for more than an hour.

It was swimming with rapid alternations of its legs, which were clearly seen in the limpid water, and pecking away in the copper-colored coating of algae that covered the basal boulders of the dike. Sometimes it pecked at some organism in the water. Most pecks seemed to be successful, as only very seldom did I see the phalarope peck again on the same spot.

After some minutes' pecking, it started stretching its wings. To do this stretching it always stood on a stone in the shallow water. The wings were stretched alternately at first—the left wing two or three times and after that the right wing.

When stretching, the upper-arm of one wing was put nearly in a 90-degree angle to the longitudinal axis of the body, and the hand-part of that wing was laid in a horizontal plane across the back, rump, or tail. The wing remained in this stretched position for one or two minutes.

A black-headed gull (*Larus ridibundus*) chanced to come that way and soared over it in search of food. The phalarope at once flashed into a crouched and immobile attitude on the water—retracted, thick-set neck, head very closely pressed to the water's surface, and bill partly dipped into the water. It kept this "frozen" attitude for some minutes, or until the gull had disappeared.

I approached to less than two feet. When I moved, it looked at me and swam away, its "flight-distance" from me being about one meter. It then started washing and preening. During its washing it remained floating on the water. The bill was continually and rapidly dipped into the water, and after each dip it was pressed against and between the breast- and throat-feathers. First, the left side of the neck, breast, and body were attended. Especially when it was preening its tail feathers, I could see how each feather was "combed" separately by shoving it between the mandibles from base to tip with a vigorous effort, ending in a real jerk. The rectrices on the left side of its body were combed to the middle of the tail. In this way also the remiges, coverts, and flank-feathers were dealt with, and after that the right side of the body underwent a similar treatment.

Now the phalarope stopped washing and cleaned its bill by lowering it to the right and by stretching its right leg over the folded wing. It then wiped its bill with its

foot at least 10 times in succession. This washing, "combing," and bill-wiping was done while floating on the water, so it happened that the fluffy-feathered bird was spinning round like a wind-blown, circling cork when bill-wiping.

In order to oil its feathers the bird evidently needed a solid stand, so it swam to a basalt boulder and stood there oiling its plumage. Its bill was tucked into the uropygial region and was rubbed strongly along the feathers there. I did not see a stiff pressing of the oil gland, however, as in common terns. When oiling, its feathers were puffed out and spread out, which gave an "untidy" impression. Especially the stiff quills were oiled, but the feathers of the underparts and the flanks were not forgotten either. This oiling lasted for many minutes.

After having oiled its plumage, there followed a vibrating ruffle of the feathers and then the bird started to swim again. When meeting the rope of an eel-trap, it first looked at it and then flew up, only to alight again on the water very soon, meanwhile uttering a rather sharp "*tsit, tsit.*"

Now the above observations certainly may have little value in themselves; it is the comparison with the same kind of movements in other species that perhaps makes them worthwhile. I tried to find comparable facts in Mrs. Nice's behavior-study of the song sparrow (1943).

The description of the *stretching movements* (Nice, 1943: 44) does not exactly fit into the phalarope's case. The *scratching of the head*, described on pages 44 and 45 seems partly to correspond to "my" wiping of the bill. This wiping was also done with a leg brought up over the wing, but the wing was not dropped down and the head was not scratched. Moreover, the bill-wiping seen by me was not at all awkward.

The "vibrating ruffle" after the oiling of the plumage seems identical with the shaking mentioned (Nice, 1943: 45). No doubt the shaking was performed in this phalarope's case to get his feathers in order.

Of the bathing reactions that I saw, only Motion 2 (the dipping of the head; Nice, page 47) seems to be of the same type. In this connection I may cite Nice (1943: 48), ". . . we need accurate observations on the bathing technique of even our commonest birds."

The crouching and immobility of the phalarope when seeing the black-headed gull partly corresponds with the second stage of "fear" in the song sparrow, mentioned by Nice on page 255. This immobility, together with the silence of the bird, certainly has biological significance—non-moving objects are mostly ignored by many animals.

Just as "enlargement" may be an element of all "impressive behavior," it may as well be that "diminution" is an important element of most cryptic and concealing behavior, at least insofar as this behavior results from the appearance of a superior predator (Nice, 1943: 154).—A. L. J. Van Ijzendoorn, *Korenmarkt 1, Hoorn, Holland.*

The white-throated pigeon nesting on the ground on New Caledonia.—Among the scattered notes on the nesting habits of the white-throated pigeon (*Columba vitiensis*) I have found only a single, vague reference to a possible terrestrial nest. According to Mayr (Birds of the Southwest Pacific, p. 65, 1945) this species builds a nest of sticks ten to 20 feet above the ground in fairly heavy timber. T. L. Macmillan (field notes, Amer. Mus. Nat. Hist.) made the same observation regarding the nest of the race *hypoenochroa* Gould on the Loyalty Islands of Uvea, Lifu and Mare. The only account suggesting that the New Caledonia population of this race nests on the ground was published by E. L. and E. L. C. Layard (Notes on the Avifauna of New Caledonia. Ibis, 1882: 528) who were informed by a local inhabitant that this was the case.

The only nest of this pigeon which came to my attention was shown to me on December 7, 1944, by Mr. Vigneron who lived on the lower slopes of Mt. Mou at an altitude of about 400 feet. He found the nest under construction about November 25. The nest was on the ground three feet uphill from the old, long-abandoned Noumea-Paita trail. It was about 100 yards in from the edge of a semi-open forest of tall trees. The undergrowth along the trail consisted primarily of scattered bunches of coarse grass and a few clumps of *Lantana camara* and other shrubs about four feet in height. A lush growth of bracken fern (*Pteridium*) three or four feet high nearly covered the forest floor to the edge of the old trail.

As we approached the nest, I caught sight of one of the parents on the ground beneath a dense growth of bracken. The bird walked a few feet; then, on loudly flapping wings, it flew swiftly out of sight, keeping within ten feet of the ground in its twisting uphill flight.

The well-hidden nest was a slightly cupped structure of small, black twigs, all apparently from the same species of tree and all about the same diameter (3 to 5 mm.) but varying greatly in length. The nest was ten inches in diameter and four inches deep at its thickest part. Leading up the slope from the nest for a distance of six feet was a slightly curved, well beaten path six inches wide. Although the surrounding forest floor was littered with leaves and twigs, this path was absolutely bare of everything but bits of caked mud. It was by way of this path that the incubating bird had left the nest.

One white egg, measuring 40.1 by 30.0 millimeters, was in the nest. It was in an early stage of incubation, Although I remained in the vicinity of the nest for several hours that day, neither parent returned. However, the loud, hooting call, '*CoooOOO–OOOO*,' of this species continued to be heard throughout the middle of the day from the woods several hundred yards above the nest. The call, surprisingly reminiscent of the hoot of the barred owl, was given at about two-minute intervals. Apparently the pair never returned to this nest because on a later visit the egg was cold and a few leaves lay on the nest and path.—DWAIN W. WARNER, *Minnesota Museum of Natural History, University of Minnesota, Minneapolis.*

Identity of Trinidad barn owls.—The two barn owls from Trinidad that were listed as *Tyto alba tuidara* (Gray) by Roberts (Trop. Agric., XI (4): 92–93, 1934) are obviously referable to the recently described *hellmayri* Griscom and Greenway (Bull. Mus. Comp. Zool., 81: 421, 1937) hitherto known from the Guianas south to the Amazon Valley. Both specimens are adult males and have wing lengths of 315 and 316 millimeters respectively.

The identity of Tobago barn owls has not been determined, but they are probably *hellmayri* or an undescribed form closely allied to this large, light colored race, since the affinities of almost all of the birds of Tobago lie with Trinidad and continental South America, the Antillean element in both of these islands being negligible. *Tyto insularis* found on nearby Grenada, the southernmost of the Lesser Antilles, is a very small and dark bird. Less is known of Tobago ornithologically than of any island of comparable size in the Caribbean Sea, and we have little information concerning its night birds.—JAMES BOND, *Academy of Natural Sciences, Philadelphia, Pennsylvania.*

Sexual selection in woodpeckers.—G. K. Noble (Auk, 53: 269–282, 1936) wrote "That the courtship of the Flicker differs from that of other local Woodpeckers in that two or more females may gather about a single male and apparently compete with one another for his attention." I have not only seen a flicker (*Colaptes auratus*)

do this, but I also saw two female yellow-bellied sapsuckers (*Sphyrapicus v. varius*) obviously competing for the attentions of a single male on January 31, 1941, in Charlton County, Georgia. On April 11, 1948, on a golf course at St. Martins, Philadelphia, I saw a female hairy woodpecker (*Dendrocopos villosus*) make advances to a male. This apparent courtship of the male woodpecker by the female is interesting in view of the fact the male woodpecker "regularly incubates at night and often more often in the day time than does his mate" (Nice, Trans. Linn. Soc. New York, II: 220, 1943).

In the case of the yellow-bellied sapsucker, two females were mewing and pursuing a male. The male seemed to be indulging in a copulation call somewhat like that of a female flicker. Finally the male accepted one of the females. They copulated and moved away. The rejected female waited quietly until the pair moved away and then flew off in a different direction.

In the instance of the hairy woodpecker, the male had been occasionally drumming on a large tree in a hollow for some time. The female flew from near by woods across an abandoned fairway and almost alighted on the male's back. They scrambled around for a moment or two. Then the male followed the female from limb to limb. Finally the female flew back across the abandoned fairway and the male followed.—FREDERICK V. HEBARD, *1500 Walnut Street Building, Philadelphia, Pennsylvania.*

A flycatcher new to Lower California.—On June 24, 1896, a female "Mexican Crested Flycatcher" was taken in the Sierra Laguna of southern Baja California by Loye Miller, who was collecting for W. W. Price. The specimen (no. 369380) later found its way to the American Museum of Natural History, where it attracted my attention in a series of *Myiarchus tuberculifer olivascens*. Through the courtesy of the authorities of that museum and of the United States National Museum, I was able to compare it with both their series of specimens. The bird is badly worn, the back being a dull, pale brownish; the bill is larger than in Arizona females of *olivascens;* the rump is grayish brown; and the crown, lores, and auriculars are dark, even where not soiled. These characters identify it as *Myiarchus tuberculifer tresmariae* Nelson. This is the first record of this species in Lower California.—ALLAN R. PHILLIPS, *Museum of Northern Arizona, Flagstaff, Arizona.*

Further notes on *Empidonax affinis*.—Through the courtesy of the authorities of the American Museum of Natural History, I was able in 1946 to restudy their series of *Empidonax affinis* and to take the more difficult specimens to Washington for comparison with the series in the United States National Museum (including the Fish and Wildlife Service collection). The results amplify my previous study of this species (Auk, 59: 424–428, 1942).

The type of *Empidonax fulvipectus* is good *affinis*, as had been presumed previously. The concept of *affinis* as an essentially non-migratory race remains unchanged. *E. a. pulverius* appears to be even less migratory than supposed. The "typical example" from San Mateo, Guatemala, proves to be *vigensis*! A specimen in the Fish and Wildlife Service collection, overlooked in my earlier study, was taken at Mojarachic, Chihuahua, January 31, 1940. The range may thus be extended west to include western Jalisco; the two females left undetermined in 1941 show only very minor differences from an April female from Durango.

The best differentiation of "*bairdi*" occurs at Momostenango and in the Department Totonicapan; the reference of the specimens from Tecpam and Quezaltenango to this race was correct, but they are not so typical, except that the wing-bars average darker. The recognition of *vigensis* in Guatemala, however, makes my previous ap-

plication of the name "*bairdi*" even more doubtful. The type should be re-identified.

The winter range of *vigensis* is indicated by a male (wing 72.2, tail 61.6 mm.) from San Mateo, northern Guatemala, February 10, 1927. This bird is too small and green for *pulverius* and does not resemble either spring or fall plumage of that race. Furthermore, the female from seven miles west of Momostenango now appears nearest *vigensis*. While undoubtedly very gray, it seems too pale on both crown and chest for *trepidus*. It is quite small (wing 64.5, tail 57 mm.).—ALLAN R. PHILLIPS, *113 Olive Road, Tucson, Arizona.*

A polydactylous jay.—June 16, 1948, Dr. Tadeuz Leser of Emory and Henry College, Emory, Virginia, presented to The National Zoological Park, Washington, D. C., four juvenile blue jays (*Cyanocitta cristata*). These birds appeared to be about a month old. They were the product of a clutch of five eggs; one egg did not hatch. One young appeared to have much difficulty in maintaining a standing position. At times it would fall over, and "hopping" was labored. An examination of its feet revealed that the specimen was polydactylous. Its many toes prevented it from maintaining a comfortable standing position. Each foot had two halluces, and four forward toes, a total of six toes on each foot. These toes were normal with the exception that the middle or third toe of each foot was partially joined to the inner or second toe. The outer or fourth toe was normal. The joint between the tibia and the tarsus displayed abrasions, for the bird rested frequently upon its tarsus in quite the same position as is commonly seen in the Gruiformes. This polydactyl bird appeared normal otherwise, except that it possessed an abnormal, voracious appetite.—MALCOLM DAVIS, *The National Zoological Park, Washington, D. C.*

January song in black-capped chickadee.—Apropos Mr. Francis Allen's communication (Auk, 64: 616–617, 1947) relative to the *phe-be-be* song of the black-capped chickadee (*Parus atricapillus atricapillus*), in something like twelve years of observation, I have never failed to hear the bird sing in January, on three to seven different days in the month. Certain conclusions, however, seemed inevitable: 1) there was no *phe-be-be* song on days of severe weather or bitter temperatures; 2) the song was almost invariably on days of warming weather, particularly of thawing weather, however slight; this was so common that there is in this region of south central Wisconsin a very definite association of the *phe-be-be* song with thawing weather to such an extent that local superstitions, that the call foretells a period of thaw, have grown up around it. It should be noted that at Sauk City, which lies along the Wisconsin River, the bird is common in its occurrence throughout the year.—AUGUST DERLETH, *Sauk City, Wisconsin.*

Bewick wren and common rock wren in Douglas County, Kansas.—In the Museum of Natural History of the University of Kansas, the author found two wrens previously unreported from Douglas County, Kansas.

Thryomanes bewickii bewickii (Audubon). Bewick Wren. This bird was stated by Long (Trans. Kans. Acad. Sci., 43: 448, 1940) to be present in Kansas only as an "accidental," on the basis of one specimen obtained but not preserved from "two miles south of Lawrence on April 10, 1920." Four specimens obtained by Dr. Claude W. Hibbard, on March 31, 1945, and March 28 and 29, 1946, from one mile west of the university campus, were identified as *bewickii* by Dr. Alexander Wetmore. Thus, it would appear that eastern Kansas is included in the regular migration route of this bird.

Salpinctes obsoletus obsoletus (Say). Common Rock Wren. An individual of this species flew into a window of the museum on October 25, 1946, and is now number 23993 in the collection of the Division of Birds. Goodrich stated in "Birds in Kansas" (Rept. Kans. State Bd. Agric., 64 (267): 255, 1945) that the rock wren is common in certain parts of western Kansas and is "rarely but occasionally found in the east"; no definite localities are cited. Specimen number 23993 is the first record of the bird for Douglas County, and seems to be the easternmost locality in Kansas from which this bird has been taken.—M. DALE ARVEY, *Museum of Natural History, Lawrence, Kansas.*

Atypical copulatory behavior of a robin.—Observations of six instances of copulatory behavior in the eastern robin (*Turdus m. migratorius*) by various people during the spring of 1948 indicated that both birds were always silent during copulation, and the act was accomplished without strife or excited behavior of any type other than occasional wing fanning by the male. One case, however, varied radically from the others. In this instance, the male advanced on the female with his wings slightly open, bill gaping, and body feathers extended, and tried to mount. She drove him away with a vicious peck. The male then mounted an earth clump, fanned his wings vigorously as he tried to copulate with it, then ran and tried to mount the female again. She dodged and ran a few steps; the male then tried to copulate with a piece of crumpled newspaper, again fanning his wings vigorously, then went to the female and attempted to mount from the front, but was again driven off. He returned once more; this time the female squatted and he mounted, apparently successfully. The female then violently attacked him and chased him away, the two flying out of sight in a long, twisting flight.—HOWARD YOUNG, *Department of Zoology, University of Wisconsin, Madison, Wisconsin.*

A robin rears a cowbird.—On May 15, 1948, in Scott County, Iowa, I found a nest of the robin (*Turdus migratorius*) which contained one addled egg and a nestling cowbird (*Molothrus ater*) which was about ready to leave the nest. Both the male and female robin showed a great deal of concern while I banded the bird. Of the many robins' nests that I have examined this is the first one that ever contained a cowbird. Friedmann (The Cowbirds, p. 193, 1929) recorded that the robin was one of the few species that refused to accept the eggs of the parasitic cowbird and usually punctured the eggs and ejected them from the nest.—JAMES HODGES, *3132 Fair Avenue, Davenport, Iowa.*

More veeries breeding in Washington, D. C.—In Auk (60: 103, 1943) I reported the first record of veeries (*Hylocichla fuscescens*) breeding in Washington, D. C. At least one of three fledglings had apparently been raised successfully by a pair that nested in "lower Rock Creek Park" in 1942.

On June 9, 1948, my wife and I heard a veery singing at the south entrance of The National Zoological Park, less than a mile upstream from the nesting site of 1942. On June 21, we discovered two veeries in the territory, both singing, and we found the two together on other occasions thereafter. It was not until July 11 that I discovered the nest, with three fledglings, about a foot above the ground in a tangle of Japanese honeysuckle. By July 17, the young were out of the nest and being fed by their parents, but I was unable to count them.

On June 13 and subsequent occasions I discovered that veeries were to be found continuously along a mile of Rock Creek, beginning about three miles upstream from the territory of the veeries in the Zoological Park. On June 20, I found a nest with

four eggs in that area. It was in the woods up the slope from the left bank, again about a foot above the ground in a tangle of honeysuckle. It held four nestlings on June 26. On July 3, it held one large and well-fledged nestling that seemed ready to leave. The next time I visited it, a week later, the nest was empty.

On June 26, Miss Rachel Carson found another nest, with three eggs, in the territory of a pair of veeries immediately adjacent to that of the pair referred to in the preceding paragraph. Again, it was about a foot from the ground in a tangle of honeysuckle close to a bridle path. It contained three fledglings on July 3, and was empty on July 10. There were almost always at least four fully-grown veeries in the immediate vicinity of this nest, and though one sometimes chased another briefly they appeared to tolerate one another's presence. Perhaps the additional birds were the young of a first brood produced by the pair responsible for this nest.

On June 26, upstream almost a mile from the nest referred to in the preceding paragraph, I came upon an adult veery feeding two or more young that could hardly have been out of the nest more than a day or two.

Thus, there were at least four pairs of veeries that produced at least 12 young in Washington, D. C. in 1948. Dr. Irston Barnes, Miss Rachel Carson, Miss Shirley Briggs, Mr. and Mrs. William Vogt, and my wife participated in some of these observations. Dr. Barnes tells me that he had observed veeries late in May, 1947, at the site of one of the upper nests described above, and had wondered whether, in view of the late date, they were not remaining to breed.

It must be that veeries have been nesting unobserved in Rock Creek Park since 1942, when the first nesting was reported, and that the small colony observed in 1948 has developed as a result.—Louis J. Halle, Jr., *1423 Shepherd St., Washington 11, D. C.*

Magnolia warbler at Lexington, Virginia, in winter.—On December 27, 1947, I collected a magnolia warbler (*Dendroica magnolia*) in Lexington, Virginia. It was a male in bright winter plumage and was in good flesh with a fair amount of fat on the skin. Except for a January and a February record given by Howell for Florida (Florida Bird Life), this is the only winter record I have been able to find for the United States. I also have a specimen which was picked up alive at Lexington on November 10, 1936, and which died on November 11 or 12.—J. J. Murray, *Lexington, Virginia.*

Hooded warbler in Calhoun County, Michigan.—On May 27, 1945, Mr. and Mrs. N. Theodore Peterson located a male hooded warbler (*Wilsonia citrina*) singing along the highway in section one, Emmett Township, Calhoun County, Michigan. The area was a beech-maple woodlot which had not been pastured for many years and had grown up to a rather dense stand of underbrush. On May 30, 1945, at 1:30 p. m. I visited the area and heard the male warbler singing before I had left the car. It required only a short time to observe him about five feet from the ground. During the period of ten minutes which I watched him, he sang from perches three to five feet above ground but at times even sang from low stumps or from the ground. He was quite tame and flew at times to within 15 feet of me. There was no doubt as to the identity of the bird; I had heard and observed them in northern Tennessee.—Lawrence H. Walkinshaw, *Battle Creek, Michigan.*

Harris's sparrows in Massachusetts.—Since April 11, 1929, when a young female Harris's sparrow (*Zonotrichia querula*) was reported from Hingham, there had been no substantiated reports of this species in Massachusetts until March 29, 1946.

On that day a male appeared at the feeding station of Mrs. Lionel Sheppard of Ipswich and stayed until May 8.

On December 18, 1946, another Harris's sparrow, an individual in immature plumage, appeared at the feeding station of Dr. and Mrs. Stephen Maddock in Boxford. Until February 21, 1947, it remained in the same neighborhood and then moved to fields and woodland edges in the vicinity of the Boxford post office, where it was last seen on May 11, 1947.—C. RUSSELL MASON, *Massachusetts Audubon Society, 155 Newbury St., Boston, Massachusetts.*

White-crowned sparrows wintering in Maryland and West Virginia.—During the Christmas holidays (1947) five white-crowned sparrows (*Zonotrichia l. leucophrys*) were trapped and banded at McCoole, Allegany County, Maryland. On January 31 and February 1, 1948, 11 more were banded and a flock of at least 21 white-crowns was counted feeding in the snow under pigweed (*Amaranthus hybridus*). On the latter date five others were observed feeding under the same type of vegetation near the Potomac River in Keyser, Mineral County, West Virginia. All birds observed were immatures. So far as is known this is the first published record for this species wintering in Maryland. It has been previously reported in winter from West Virginia in Hampshire, Kanawha, and Cabell Counties (Maurice G. Brooks, 'A Check List of West Virginia Birds,' 1944).—LEONARD M. LLEWELLYN, *United States Fish and Wildlife Service, Patuxent Research Refuge, Laurel, Maryland.*

NOTES AND NEWS

ON November 10, 1948, William Vogt was awarded the Mary Soper Pope Medal by the Cranbrook Institute of Science, Bloomfield Hills, Michigan. The medal is given for noteworthy and distinguished accomplishment in plant science. In making the award the Institute took cognizance of the main theme of Vogt's book, *Road to Survival*, that the renewable natural resources,—forests, grasslands, soils, waters, wildlife and humans—are "inextricable strands of one whole natural fabric." His leadership in conservation education was also noted.

DR. David E. Davis is the new editor of 'The Wilson Bulletin.' He is now at Johns Hopkins University as Assistant Professor in the School of Hygiene and Public Health.

RECENT LITERATURE

Check-list of birds of the world. Volume VI. PETERS, JAMES LEE. (Harvard Univ. Press, Cambridge), pp. xi + 259, September 27, 1948. Price, $6.50.—It has been nearly 50 years since a comprehensive list of the woodpeckers has been published—Sharpe's 'Hand-List' (1900). The strictly American families of the toucans, puff birds, and jacamars were treated by Cory (1919), and the barbets of the world were reviewed by Ripley (1945). Otherwise there have been but fragmentary discussions of limited groups or populations. The present volume, therefore, is especially welcome. The woodpeckers, in particular, as suggested above, have been in need of study and Mr. Peters's arrangement does good service in clarifying their relationships as well as in facilitating further work in the group as additional discoveries make this necessary.

As was to be expected, the number of genera recognized in the entire order is less than that accepted by Sharpe, although the proportion does not hold for the individual families. One genus of honey-guide, discovered since Sharpe's work was published, raises the number of recognizable genera in that family by one. Peters recognizes ten genera of puff birds compared with Sharpe's seven, although in the intervening period Cory had accepted 13. The barbets are reduced to 13 genera and 79 species as compared with Sharpe's 21 genera and 140 (monotypic) species, above Ripley's nine genera and 66 species. The woodpecker family with but 37 genera shows a welcome reduction from Sharpe's 50.

Since the publication of volume 4 of this series, a disturbing discovery was made in Europe with respect to one of the provisions of the International Code of Zoological Nomenclature—a provision whose full import has been generally overlooked and which, strictly interpreted, will require the rejection of many generic names now accepted and in current use. So serious are the implications that an effort is being made to have this provision annulled. In the mean time, Mr. Peters has held in abeyance the changes in the Order Piciformes that would be required under this article of the Code.

As may be gathered from the preceding paragraphs, the present volume embraces the Order Piciformes, including the Galbulidae, Bucconidae, Capitonidae, Indicatoridae, Ramphastidae, and Picidae. Two new names are proposed: *Melanerpes rubricapillus rubricomus* (for *Centurus rubriventris* Swainson) and *Picus canus sobrinus* (for *P. c. ricketti* Stuart Baker).—J. T. ZIMMER.

Birds over America. PETERSON, ROGER TORY. (Dodd, Mead & Co., New York), pp. xiii + 342, 79 pls., 6 figs., October 4, 1948. Price, $6.00.—Mr. Peterson, artist-naturalist, is well known for his valuable field guides that have helped many a bird student in problems of identification. In his own travels in search of birds he appears to have visited all but one of the states of the Union. In the present book he recounts many experiences in the course of informal discussions of much wider scope. Warbler waves, falconry, conservation, "bird lists," migration, introduced species, and similar topics form the basis with which is woven the thread of the author's observations. It is not a narrative of wanderings as much as a general discussion of varied ornithological topics.

It has made an interesting book in which there is a great quantity of excellent ornithological information. The illustrations, nearly all by the author, are interesting, artistic, and sometimes unique, as is the photograph of the European goldfinch on Long Island.—J. T. ZIMMER.

Flight into sunshine. CRUICKSHANK, HELEN G. (Macmillan Co., New York), pp. x + 132, figs. 1–121, October 5, 1948. Price, $5.00.—Florida has always attracted ornithologists and other naturalists. It has a wealth of plant and animal life unlike that to be found elsewhere in the United States and presents the nearest approach to tropical conditions to be found in the country. When an experienced photographer like Allan Cruickshank chooses to visit the region to obtain pictures of Florida birds, the results are sure to be worth while, both as to experiences to be narrated and photographs to be exhibited. Mrs. Cruickshank, who accompanied her husband on the present expedition, has given us the story of the trip, and Mr. Cruickshank has supplied the illustrations. In both particulars, the volume here noted may be highly recommended.

Mrs. Cruickshank's narrative contains many interesting details of their peregrinations, descriptions of the land and water (particularly the water), and accounts of the birds and other animals encountered. The principal focus of attention was the various rookeries of herons, ibises, and other water birds, and the accounts contain many interesting observations on behavior and other characteristics. Such was the sight of ospreys fishing while standing in shallow water; the discovery that snowy egrets have their lores cherry red for a limited period during the courting season; and the finding in the digestive tract of a single large cottonmouth mocassin one glossy ibis egg, three Louisiana heron eggs, part of another egg, a large young American egret, and an adult glossy ibis.

Needless to say, Mr. Cruickshank's photographs are of fine quality and are more than adequate and interesting adjuncts to the text.—J. T. ZIMMER.

Making friends with birds. PARK, A. F. (Macmillan Co., New York), pp. xi + 216, figs. 1–164, August 24, 1948. Price, $6.00.—The author of this interesting volume has experimented with the problem of photographing wild birds without the use of a blind. The fine series of photographs he presents attests the success he has attained. His method is first to make a preliminary observation of the individual bird to determine its temperament; and second, to develop friendly relationship if the first step warrants it. A ten-minute study has proved sufficient to gauge a bird's qualities, and if it proves of too shy a disposition to warrant further advances, it is left forthwith. If more confiding and friendly, the second step is begun—a much more lengthy procedure.

Perhaps the most striking example recounted is that of a female willow warbler which became so trusting that it would enter its nest over and around his hand held at the entrance and even, when the hand completely blocked the doorway, would wait until the fingers were spread slightly apart and feed the young through the narrow aperture.

Experiences with some two dozen species are recounted with the addition of many valuable observations on the behavior of the birds in question. One interesting series of pictures shows a young greenfinch daily from shortly after hatching until 14 days old—each picture taken at the same time of day and at the identical distance and thus presenting an accurate demonstration of development of size as well as of other features.

That the pictures are good is evidenced by several from a series taken of pied flycatchers bringing food for the young, from which the identity of the insect food (given in a table) had been determinable, often to the species.

The book is most interesting and informative. Bird photographers will find each of the pictures documented as to camera, lens, diaphragm, emulsion, filter, and lighting.—J. T. ZIMMER.

British Birds. WILLET, WILFRED. (Adam & Black, London), pp. vii + 196, 44 text-figs., 16 col. pls., November 23, 1948. Price, $2.50.—The introductory chapter is in many ways the most valuable in this book which was designed for the individual just beginning bird-watching. Here we find hints on making worthwhile observations, conservation, notebooks, field characters, and worthwhile cautions about reporting rare birds. There are no species accounts as such; related groups of birds are discussed together and comparisons are made as to size, general habitat, seasonal occurrence, nests, and relations to agriculture.

The book would be hard to use for field identification; pertinent identifying features are placed together with natural history notes of the group. The discussion of each group is interesting for leisurely reading.

A major criticism is that no scientific names are present anywhere, and that the indexing is insufficient. The text-figures add little in the way of aids to identification; in my copy at least, many are either poorly cut or poorly inked. They do of course make the book of greater interest to the amateur. The colored plates add much to the value of the book. Plates on young birds and on types of wings and tails are of special value.

This treatment of British birds is worthwhile at the level for which it was intended, but it is of little significance to the advanced ornithologist.—H. I. FISHER.

Days without time. TEALE, EDWIN W. (Dodd, Mead & Co., New York), pp. xiv + 283, 79 pls. (143 figs.), September 20, 1948. Price, $6.00.—Readers familiar with Mr. Teale's earlier books will not need to be reassured that the present volume offers some hours of enjoyable reading. The twenty-nine chapters cover a wide range of natural history subjects from mammals (including man) to the amoeba and the plant kingdom. Days without time are those days when one can forget clocks and the routine duties that keep him chained to schedules and can stay out-of-doors and at his leisure watch the world of nature about him. Mr. Teale appears to have found the way to do this and has found the way to tell us about his discoveries.

Each chapter forms an essay by itself. Since the author is a keen observer with a wide range of interests, he has managed to bring in a variety of interesting information bearing on the subject under discussion. There is not a dull page in the book.

Birds, of course, receive their full share of the spotlight, both as major subjects and in secondary rôles. A chapter on John Burroughs and Slabsides has ornithological connotations, and one on W. H. Hudson and his early collaboration with the Smithsonian Institution is even more definitely ornithological. The fine photographs that illustrate the volume are as varied as they are excellent.—J. T. ZIMMER.

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OBITUARY

PIERRE JABOUILLE, who died in Paris on May 14, 1947, will be remembered as one of the pioneer ornithologists of French Indochina. For a quarter of a century he was my close friend and associate. The greatest part of my collecting and of my studies on the birds of that country were undertaken in collaboration with him. We worked in the field from 1923 until 1933 when he retired and came to live with me at Clères. There he continued to help in the study of oriental birds and in editing 'L'Oiseau.'

Born at Saintes, France, November 25, 1875, the son of a Prefect, Pierre Jabouille made his career in the Civil Service, first in France, and after 1905 in Indochina where he occupied with great distinction and success a number of positions, ending as a Governor.

A bright mind, quick-witted and energetic, Jabouille was most kind, hospitable and unselfish. He proved to be a perfect companion, good tempered, jolly, and optimistic, despite sufferings and handicaps due to illnesses contracted in the tropics. His fortitude was indeed remarkable; he could hardly see or walk during the last few years of his life, and the war and its consequences obliged him to face great material hardships. He never complained, however, nor did he cease to be thankful for the many good years he had enjoyed.

An excellent ornithologist, specializing in Far Eastern birds, Pierre Jabouille contributed alone, or in association with me, a number of works and papers.

Personally, I shall always mourn the loss of an excellent friend with whom I spent the greatest part of the best 25 years of my life.—JEAN DELACOUR.

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